

Title:

The Los Alamos National Laboratory Student Internship Program: A Formative Evaluation

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Executive Summary

This summary highlights stronger findings described in the report. A fuller summary is offered at the end of the report.

- *Career Direction:* Internships enabled the majority of interns to choose, refine, clarify, or reconsider their career direction or goals. Taking 1998 and 1999 together, 88.2% of individual observations on this issue in the survey comment data cited the program's role in shaping interns' career direction as a major benefit. This finding (which is also supported by the interview data), clarifies the ambiguous finding of a "Yes" answer by 70-72% of the survey respondents (across both survey years combined) to Survey Question 7 that asked, "Has this experience had any influence on your career plans or goals?" The qualitative data sets also offer insights on the processes by which these beneficial effects occur.
- *Nature of the Internship Experience:* Interns' survey comments portrayed the internships primarily as a work experience in which they learned professionally-relevant skills rather than as an educational experience *per se*. Limited emphasis on increasing interns' appreciation of the nature of science, and how science is done, appears to distinguish LANL undergraduate internships from undergraduate research experiences in colleges and universities. Existing survey questions exploring the internship as an educational experience were too narrow to discover much about the intellectual gains of internship experiences. However, both the interview and survey comment data clarified the nature of the work-related learning gains of interns.
- *Mentors:* Interns' overall evaluation of the mentoring they had received was, by all indicators, positive—both in terms of how well mentors fulfilled their formal duties, and in the quality of their relationships with interns. Survey comments data yielded 290 positive (82%) and 64 negative (18%) individual assessments of mentoring across both survey years; individual positive statements about interns' working relationships with their mentors were offered in 44 out of the 47 (group) interviews. The means for both survey questions (3 and 4a) that solicited interns' evaluations of their mentors were also positive: 1.59 and 1.56 for 1998 and 1999, respectively (Q3); 1.77 in 1998 and 1.71 in 1999 (Q4a). The qualitative data also provided useful definitions of what interns experienced as "good" and less good mentoring.
- *Student Advisors:* were far less used or appreciated than mentors, and the quality of the service appeared to vary by department. Question 14a (rating the interaction/availability of Student Advisors) was one of the lowest-scoring questions in the survey data (with a mean of 2.51 for 1998). Survey commentators offered 101 negative observations over both years. In half of these, interns wrote that they were unaware they had a student advisor, had not been assigned one, and did not know what their role might be. Some departments were described as better than others in providing student advisors and linking them with interns. The other half of the negative observations described the limited nature and poor quality of their interactions with their student advisors. By contrast, those 37% of comment writers

who had interacted with their student advisors described them as a useful source of information and personal support.

- *Learning about the Program:* 82% of the interviewees addressing this issue had applied for an internship on the basis of informal contacts and word-of-mouth descriptions of opportunities available at LANL. Interns saw internships as insufficiently publicized. Interns of color reported how little the members of their own groups knew about LANL programs.
- *Application Process:* Both survey and interview commentators found the on-line application process easier, more convenient, and faster than paper application. However, some survey commentators still found the process lengthier than necessary; some reported problems with the application program; and some discovered that mentors were unaware that on-line data on applicants was now available and were not using it. Returning interns questioned the value of completing full applications for each return, and suggested introduction of a shorter form that would up-date their original applications. Administrative delays and errors in processing applications had not been resolved by the on-line system. Some high school interns had computer access problems; international interns found the process prolonged and reported cultural bias in questions.
- *Job-Matching Process and the Educational Work Plan:* Many interviewees could not discern any consistently-applied rationale for placing interns in particular work positions: some interns were observed to be unqualified for the work they were asked to do; some were entirely mis-matched, or found themselves placed in situations where their skills and knowledge were not drawn upon; some had insufficient work to do. More of these concerns were expressed by female undergraduate interns and interns in office/administrative work. Both interviewees and survey commentators expressed a strong belief that “connections” with existing LANL staff interfered with the official procedures that were intended to match work assignments with interns’ qualifications, experience, and interests. These concerns detracted from the perceived efficacy of their Educational Work Plans. However, in the survey comment data, more positive than negative evaluations were offered by interns who felt they had been appropriately placed and that their EWP had given their work a useful direction.
- *Financial Support and Interns’ Salaries:* In 34 (out of 47) group interviews, on or more interns described program support in their departments as adequate. However, in half of the interviews (especially those containing graduate interns) other interviewees described funding as unevenly distributed between departments and projects. Opinions about the adequacy of interns’ salaries varied greatly, and there are suggestions of differences in levels of satisfaction by gender, race/ethnicity, and intern seniority (undergraduate versus graduate). These concerns may warrant further clarification in program evaluation.
- *Housing and Living in the Los Alamos area:* There were five times the number of negative as positive comments on housing in the survey comment data—the highest

number of negative responses on any issue in this data set. Similarly, in all 21 interviews with graduate interns and in 20 of 26 with undergraduates, interns defined housing as a serious problem. Women cited more problems in finding accommodation than men. Concerns focused on limited supply, poor quality, and high cost. Student housing was insufficient to meet demand, and lacked kitchen facilities that would allow interns to reduce their living costs and counter the shortage of local restaurants that are open when interns finish their evening work. Transportation issues were described as highly connected to housing problems: the slowness and danger of commuting, and insufficient on-site parking were raised in 29 focus groups. Evaluations of the LANL taxi service for on-site commuting were complimentary about the drivers, but highlighted service difficulties that impeded work. Interns suggested shortening response time, increasing availability, extending hours and pick-up locations, and provision of a shuttle (including weekends) to and from local communities.

- *Student Government Association Activities:* Although evaluations of the SGA social program contained in the two qualitative data sources were broadly positive, most interns who wrote or spoke on this issue were limited in their SGA participation. Questions asking students to rate the quality of their “extracurricular activities” scored the lowest of the ordinal survey questions. Regular participants were a distinctive subset that was more undergraduate than graduate, younger than older, more female than male, more white than non-white, more American than foreign, more “visiting” than local, more single than married, and more without than with children.
- *Issues of Gender and Race/Ethnicity:* The data on these issues is, as yet, limited, and warrants further exploration and monitoring. The dominant emergent issues were: a perceived imbalance (highlighted in the qualitative data sets) between the sexes in the type and level of work offered both to interns and to regular LANL staff; a record of skewed work distribution by race/ethnicity (also noted in the qualitative data) that was evident in the 2000 survey data. These data indicate over-representation of white interns (relative to their overall numbers) and under-representation of Hispanic interns in science and technical positions, while Hispanic interns (especially) were over-represented and white interns under-represented in office/administrative jobs. Issues of work climate, cross group tensions, prejudice against international interns, and some instances of harassment or discrimination, were also documented. However, these data are too incomplete to attempt estimates of prevalence.

Overall, the results from analysis of the ordinal/nominal survey questions for 1998 and 1999 indicate a high degree of satisfaction among interns. This finding is substantiated by both qualitative data sets, with agreement across all three data sources on the positive role played by the programs in shaping interns’ career directions, providing valued work experiences and the opportunity to learn professionally-relevant skills, and the strong, positive role in the achievement of these benefits played by their mentors.

1. Introduction

This is a formative evaluation of the Los Alamos National Laboratory (LANL) Student Internship Program. A formative evaluation answers the question, “How are we doing?” with respect to any program. In this case, it offers feedback to the program directors, staff, and participants on the efficacy of many aspects of the program as they are perceived by three years of interns (1998-2000) and reflected in four types of data (described below). The findings may be useful in guiding thought about what changes might be made, both in aspects of the program, and in the design of the evaluation strategies intended to monitor their impact.

This is not a summative evaluation that can answer the question “How did we do?” with respect to the achievement of specific, articulated program goals. A summative evaluation entails the design of a research strategy that can discover the degree to which particular program goals have been achieved. Such a design would typically include comparative, longitudinal, and/or experimental methods. For this evaluation, three of the four data sets were collected by LANL: the research team had no input in their design or collection. This distinction does not, however, diminish the value of formative analysis, especially where (as in this case) several data sources are available for cross-referencing, and it becomes clear where data are, and are not, adequate to answer certain questions. Some findings are very strong in and of themselves, and can be used as the basis for policy discussions. Others are more tentative, but point to issues where there is a need to collect data that can better clarify the situation.

A. Description of the Data Sources

The findings offered in this report were derived from four data sources:

1. A selection of minutes from two LANL committees (CQI and SPAC) concerned with the LANL internship programs
2. Survey data from 1998 and 1999 (with some reference to the 2000 survey)
3. Interns’ write-in comments from the 1998 and 1999 surveys
4. Interviews with graduate and undergraduate interns in summer 2000

Sources 1-3 were provided by LANL. The interview data were generated by the research team at Ethnography & Evaluation Research, the Bureau of Sociological Research, the University of Colorado.

The committee minutes were helpful in establishing the concerns and questions of three bodies most closely associated with the internship program and, thus, provided a useful orientation for the research team. A careful reading of these documents generated the following list of questions that were embedded in the committee record:

1. The internship as an educational and work experience:
 - a. Were the interns’ experiences primarily educational, work-focused, or some balance of the two?

- b. Was the work done by interns relevant to their academic fields of study and/or to their intended career paths?
 - c. Did the students' work plans relate to the work they actually did? Were these plans useful in guiding their work?
 - d. To what extent did the needs of departments or projects to which interns were assigned take precedence over the learning or work experience needs of interns?
 - e. How effectively were work safety issues addressed?
- 2. Relationship with LANL personnel:
 - a. What was the frequency and quality of interns' contacts with their mentors (and student advisors)?
 - b. What did mentors (and student advisors) contribute to the interns' education and work experience?
- 3. What did the following aspects of the internship program contribute to their experiences?
 - a. On-line application
 - b. Orientation and orientation materials
 - c. The activities of the Student Government Association (SGA)
 - d. The student programs web-site
- 4. What were the interns' levels of satisfaction with the following aspects of their internship?
 - a. Housing
 - b. Transportation
 - c. Health Insurance

Some of these issues have fundamental significance for the overall character of the program; others reference issues of program organization, practical concerns, and less central aspects of the interns' experiences. A comparison between this list and that contained in the contents page of this report indicates that the three main data sources (2-4) were able to address all of the major questions and most of the minor ones also. However, the data also addressed questions that were not raised in the committee minutes that may be considered important. These include:

- 1. What factors create variability in the quality of internship experiences?
- 2. How well do the application, selection, and work assignment processes serve the goals of the program and the aspirations of the interns?
- 3. Are the experiences of interns affected by biases of gender or race/ethnicity?
- 4. Are there other aspects of the organization of the internship program that could be improved?

The program directors might wish to consider adding survey questions (and/or additional evaluation methods) in light of the findings offered in this report. With this in mind, the research team has highlighted issues that could usefully be explored, and some survey

questions that could be reworded, so as to regularly tap into the kinds of feedback that were provided largely by the two main text data sources.

B. Organization of the Report

The (quantitative) findings from the survey data are presented first, and separate from, the text data analyses. This is because the survey findings leave some unanswered questions that the researchers were better able to address with reference to the write-in comments and interview data. (This is one of the benefits of using a triangulated research method.) Results from the analyses of the textual data are viewed as the most important parts of the report: they were the original impetus for the study and offer insights than can be used to inform both policy decisions with respect to the internship program, and some redesign of the survey that is currently its main method of evaluation. In some sections, it seemed useful to combine the reports from the two text data sources; in other sections, they are offered serially: whichever data source offered more information is presented first. On certain issues, information is limited largely to one source. Links between the survey and text data findings are offered as available.

The qualitative findings of the report are derived from the text data analyses and are organized into three major sections: the first is concerned with the effects on interns of aspects of the internship experiences that are mediated by the mentors; the second section discusses the nature, quality, and impact of mentor-intern relationships; the third section considers aspects of the interns' experience that are shaped by institutional policies and by LANL's community context. Finally, interns' overall evaluations are offered along with researchers' recommendations for refinement of program evaluation methods.

Quotations from the interview data and the survey comments data are offered throughout the report. Interview quotes are not attributed. Survey comments are followed by the survey date. However, where survey comments were available for only one year (or the question on the survey was changed), this is stated, and intern comments are not dated. Both types of quotations are given as written or as spoken, without editing, and are distinguished from the text narrative by indenting, rather than by quotation marks.

2. Survey: Description, Methods of Analysis and Findings

The responses to the survey's ordinal (i.e., non-textual) questions will be discussed in the context of the concerns of the Student Programs Advisory Committee (SPAC) as identified above. The three general concerns that dominate the documents from this committee are: 1) the quality of the internships as work and educational experiences; 2) the quality of the relationship between interns and LANL personnel: in particular, mentors and advisors; and 3) the quality and effectiveness of LANL programs and activities designed to help interns adjust to their internships. Each survey question is grouped below under one of these categories and discussed in relation to other questions in that category.

A. Description of the Survey

The survey was delivered to Ethnography & Evaluation Research with results already entered into *Excel* spreadsheets. The surveys to be analyzed had been administered to LANL interns in 1998 and 1999.¹ The 1998 survey had 404 respondents from a population of 1,401 interns, and the 1999 survey had 331 respondents from a population of 1,424 interns. The survey questions arrived in a separate document from the *Excel* spreadsheets. The questions on the survey and spreadsheets had not been numbered. The questions were subsequently numbered to facilitate the analysis of the survey responses.

The surveys contained three types of questions: 1) questions on a scale (viz., ordinal questions), where interns were asked to evaluate an aspect of the program on a five point scale; 2) nominal "yes/no" questions in which interns were asked if they had participated in some activity, or about some aspect of the program; and 3) questions where interns were asked to comment on an aspect of the program, usually following an ordinal or "yes/no" question about the same topic. This section of the report is a discussion of the first two types of question. Thus, the results of the ordinal and nominal questions will be presented below, with reference to tables and bar charts in the appendices. The survey questions are reproduced in Appendix A1.

B. Method of Analysis: Ordinal and Nominal Responses

As mentioned above, there are two types of questions to be analyzed here, the ordinal questions and the nominal questions. Ordinal questions presented the respondent with the choices "1-5" or "N/A." These are shown below in Figure 1 with the corresponding definitions. This scale is somewhat unusual in that, the higher the number, the more negative the evaluation. It is standard practice in survey design to have the larger number represent the more positive evaluation. Thus, when the mean of an ordinal question is said to be higher, this denotes that the interns have, on average, given it a more *negative* evaluation.

¹ The surveys were almost identical and differed in only a few questions, which are noted below.

Figure 1: The Five Response Categories for the Ordinal Survey Questions.

1	=	Excellent
2	=	Very good
3	=	Satisfactory
4	=	Needs improvement
5	=	Poor
N/A	=	Not Applicable

The nominal questions offered “yes/no” as possible responses. It should be noted, however, that the same categories of response were not offered in each “yes/no” question. Two questions offer “yes/no/N/A” as options, five questions offer “yes/no/blank” as options, and four questions have “yes/blank” as options.²

Appendix A2 gives the overall means and standard deviations for each ordinal question, as well as the number and percent of respondents who chose each option. In other words, it shows the number and percent of total respondents who chose “5,” who chose “N/A,” etc.³ Appendix A3 shows the overall results of the nominal questions.

C. Method of Analysis: Statistical Tests and Comparisons

Calculating means and standard deviations for the ordinal questions treats the ordinal answers as if they were continuous variables. They are not, of course, continuous variables, but it is nevertheless common practice to treat them as such. The original scale of this type, the Likert scale, was constructed precisely for this purpose: to treat ordinal variables as if they were continuous variables so that they could be subjected to tests of significance, regression analysis, and other statistical procedures.

The means, therefore, are not isomorphic with the categories 1-5. For example, a question may have a mean of 1.96, which falls outside any of the survey’s categories. Despite the somewhat artificial nature of means derived from ordinal data, they are still useful as measures of central tendency. Likewise, the standard deviations provide additional information about the distribution of scores. Yet, to give the most complete account possible of the distribution of scores, the responses to each ordinal question are given in histograms in Appendix B. These histograms (or bar charts) provide a quick, graphic picture of how many respondents chose each response category. The reader is encouraged to refer to these when reading the results below.

² The discussion below omits the “yes/blank” category, which is only offered in the four parts of Question 12. These questions ask the interns if they participated in a “performance evaluation process.” The nature of the question is such that there is no meaningful context in which it can be discussed in this report. The results of the question are, however, included in Appendix A7.

³ Question 11a was not asked on the 1999 survey, and question 14a was scaled on a 1-6 scale in 1999. The latter makes comparisons between years on 14a impossible. Therefore, these questions do not appear in the analysis.

The overall means for the ordinal questions and the overall percentages for the nominal questions were subject to tests of significance.⁴ All were significant at the .01 level, meaning we can be 99 percent certain that they represent the true mean, or proportion, of the student population. This is not surprising given the large sample sizes, especially vis-à-vis the size of the populations. The student population in 1998 was 1,401, and the sample size (i.e. those interns who filled out the survey) was 404. The latter represents 28.83 percent of the entire population. Similarly, in 1999 the student population was 1,424, and the sample size was 331. This represents 23.24 percent of the entire population. These are large samples, and it would be surprising if most means and proportions were not statistically significant.

One caveat is that we are treating these “voluntary samples” as if they were random samples. There may, in fact, be differences between interns who filled out the survey and those who did not, thereby biasing the samples. Nevertheless, the large sample sizes make this bias less likely, since the samples are likely to have enough interns to dampen any voluntary survey bias that might exist among some proportion of the sample.

A number of statistical comparisons were carried out in this analysis. One was to compare means for the same questions across years. These scores were quite stable from year to year, and the differences between them statistically insignificant. That is, we can be more than 99% certain that the differences between the means from the two years are attributable to chance. Likewise, results from the nominal questions were also stable across both years, with statistically insignificant differences between them.⁵

A second type of comparison was made between means or between proportions for different categories of respondent. Means and proportions were tabulated according to categories for which information had been collected. The one category for which information is available for both years is the student program, viz. GRA, HS Co-op, and UGS. When the responses to each survey question were disaggregated, means and percentages could be computed for each program. The result, for example, was a mean of all GRA interns on question 1a, a mean of all UGS interns on question 1a, etc.

The means and proportions for different programs were themselves statistically significant. That is, the means and proportions for any given question in any given year, for both the GRA and UGS programs, was likely to represent the relevant mean or proportion of that program’s population. Conversely, unless otherwise noted, none of the differences between categories for either ordinal or nominal questions were statistically significant. The tabulations by program for ordinal questions appear in Appendix A4, and for “yes/no” questions in Appendix A5.⁶

⁴ “Overall means” and “overall proportions” are defined in the next section, “Survey Results.”

⁵ Thus, unless otherwise noted, differences in means or proportions between years can be assumed to be insignificant.

⁶ The program tabulation contains the following four categories: GRA, UGS HS-Co-op, and “Other.” The latter category contains few interns in either year, and also cannot be placed in a meaningful context. It was therefore not included in the analysis.

Unfortunately, the sample sizes in both years for the HS Co-op program were too small to produce statistical significance. Therefore, discussion of scores (means and proportions) from this group does not appear in the following analysis. The problem of small sample size is also present in the tabulations for race/ethnicity. Only two groups, Hispanics and Whites, had sufficiently large sample sizes to produce statistical significance. Therefore, it was only possible to discuss differences between these two racial/ethnic groups.

The third type of comparison uses race/ethnicity or sex as categories for comparing responses. Unfortunately, this could only be done for the 1998 survey.⁷ The race/ethnicity and sex tabulations produced few statistical differences between race/ethnicities or between sexes. The tables for these categories are in Appendices A6 and A7. The most salient differences between different races/ethnicities and between the sexes are visible in data received for the year 2000, and are contained in Appendices A8 and A9. The statistical results of race/ethnicity and sex differences will be discussed in section E, below.

D. Survey Results

Each of the survey's questions was analyzed by examining the overall means or "yes/no" percentages for that question. "Overall means" and "overall percentages" refer to results that have not been tabulated by program, race/ethnicity, sex, or any other criteria. The results for the ordinal questions are presented as bar charts in Appendix B. These charts give a concise visual picture of the distribution of interns' responses to each question.

Descriptive Statistics of Respondents

The descriptive statistics gathered about the respondents in both surveys are limited in scope. Both surveys asked respondents which program they were in (viz., GRA, UGS, or HS-Co-op). Only the survey from 1998 asked respondents to mark their sex and racial/ethnic background. The 1999 survey did not ask respondents to mark their sex or race/ethnicity. In addition, neither survey asked respondents to name their job category, as distinct from their program.⁸ Table 1, below, shows the descriptive information solicited from the survey sample for both years.

Fortunately, LANL provided the evaluation team with descriptive data for the entire population of interns in the year 2000, including program, job category, race/ethnicity, and sex. This information will be visited below in section E, below, where its usefulness can be more clearly ascertained.

⁷ The 1998 survey asked for the respondents' race/ethnicity and sex; the 1999 did not. See Table 1 below.

⁸ The job categories are TSM (graduate interns in SMET), TEC (undergraduate and high school interns in SMET), and OS/GS (graduate, undergraduate, and high school interns in administration).

Table 1: Descriptive Statistics from Surveys.

YEAR of SURVEY		1998		1999	
N=		404		331	
GENDER					
Female		184	45.54%		
Male		201	49.75%		
No gender given		19	4.70%		
		404	100.00%		
RACE					
Asian		15	3.71%		
African-American		8	1.98%		
Hispanic		139	34.41%		
Native American		7	1.73%		
White		177	43.81%		
No race given		58	14.36%		
		404	100.00%		
PROGRAM					
GRA		80	19.80%	64	19.34%
UGS		287	71.04%	235	71.00%
HS Co-op		10	2.48%	11	3.32%
"Other," blanks		27	6.68%	21	6.34%
		404	100.00%	331	100.00%

Overall Question Results

The overall results for both years on the ordinal questions indicate a generally positive student evaluation of these survey items. The means for the ordinal questions fall between 1.56 and 2.56, with standard deviations around 1. Importantly, none of the means dipped into the “satisfactory” range (a score of 3) or higher (i.e., a more negative evaluation). The scores are quite stable between the two years, which indicates that intern perceptions of the internship program remained largely the same, and that the survey is reliable. The same generalization can be made about the overall percentages for the “yes/no” questions: that the responses are, in almost all cases, quite stable from 1998 to 1999.

Lab Work as Educational and Work Experience

One of the major concerns of the SPAC was the nature of the work and educational experience of the interns at LANL. Part of this concern was whether the interns’ experience was primarily an educational or a work-related one. In conjunction with this, they were interested in knowing if the interns were being used as or perceived themselves, as a pool of “cheap labor.” Unfortunately, the surveys do not directly address the latter issue. However, they offer some insight into the interns’ experiences and into some aspects of the relationship between the interns’ work and their education.

The survey addresses the interns’ educational and work experience in Questions 1a, 2, 5, 6a, 7a, 8, and xi. These questions are worded as follows:

Please rate the following:

- 1a. Overall laboratory experience:**
 - a. work?**
 - b. infrastructure?**
- 2. Applicability of research to academic field of study.**
- 6a. How well did the work plan describe the work you actually did during your appointment?**
- 5. Was your work plan (assignment) discussed before your student appointment began?**
- 7a. Has this experience had any influence on your career plans or goals?**
- 8.⁹ (1998) Do you feel that you were given sufficient safety training to do your job in a safe manner?**
- 8. (1999) Do you feel that the subject and practice of safety was taken seriously by your coworkers, managers and fellow employees?**
- xi. Was the main focus of your work assignment supporting your thesis?***

The results for these questions are in Appendices A2 and A3. Questions 1a, 1b, 2, and 6a are ordinal questions, while questions 5, 7a, 8, and *xi* are nominal questions. The former are represented graphically by the bar charts in Appendix B.

The means for question 1a were 1.89 and 1.94 for 1998 and 1999, respectively. Tabulation by program for all ordinal questions is presented in Appendix A4, and for all “yes/no” questions, in Appendix A5. Tabulating the scores by program for Question 1a showed that the means for graduate interns were slightly lower (reflecting a more positive evaluation) than for undergraduates or HS Co-op interns. This difference is not, however, statistically significant. The larger number of undergraduate respondents vis-à-vis graduate respondents pulls the overall mean closer to the mean for undergraduates. In general, the overall and program means for question 1a reflect a strong, positive evaluation of this survey item and that it is stable across years.

The responses to Question 1b concerning “infrastructure” were not as positive, with a mean of 2.33 in 1998 and 2.39 in 1999. The histogram for question 1b clearly shows these results. Unfortunately, the survey data do not provide enough information to make a clear interpretation of this result.

The overall means for question 2 are 2.10 in 1998 and 1.98 in 1999. When tabulated by program, there was a substantial difference between the graduate and

⁹ Somewhat different versions of Question 8 were used in the 1998 and 1999 surveys.

undergraduate means. The graduate means were 1.75 and 1.60 for 1998 and 1999, respectively. The undergraduate means for the corresponding years were 2.20 and 2.09. The differences between the program means are statistically significant. A much higher percentage of undergraduate than graduate interns marked “N/A” as a response. This can be seen in Appendix A4. One interpretation of the latter results is that undergraduate interns do not see themselves as having (or do not have) a research focus; thus they do not think this question is relevant to them.

Question 6a follows up on Question 5 by asking the interns to rate how well the work plan described the work they actually did. Scores for this question were generally positive, with means of 1.96 in 1998 and 2.04 in 1999. Approximately 10 percent of interns marked “N/A” for this question in each year. The positive scores are visible in Appendix B, Chart 6a, where the scores are clumped around response categories “1” and “2.”

The percentages in the response categories for Question 5 show that interns’ work plans were quite frequently discussed with their mentors: 84.41 percent of interns in 1998, and 82.78 percent of interns in 1999 marked “yes” in response to question 5. Negligible percentages (2.23% and 4.23% for 1998 and 1999, respectively) left this question blank.

Question 7a asks if interns’ LANL experiences influenced their “career plans or goals.” Over two-thirds of respondents chose “yes” for this question (72.28% of respondents in 1998, and 70.39% of respondents in 1999). As with the “yes” response, the percentages who marked “no,” or who left the question blank, were also quite stable across both years. The program tabulations show that 83.75 percent of graduate interns marked “yes” in 1998, but that this difference with all the other program means was not statistically significant.

Note that the question does not specify the nature of LANL’s influence, and that the response categories provide ambiguous results. For instance, a high mark may mean that the intern perceived their LANL experience to have had a strong effect on their career aspirations, but the effect was to discourage the student from pursuing a career in science, mathematics, or technology. The intern may have scored it highly because their experience at LANL was a primary influence on their decision to change career plans, not necessarily because it was a positive influence. This could, in turn, occur while other interns scored the question highly because their LANL experience generated or reinforced their desire to pursue careers in SMET. Given the ambiguity of the question’s wording and of the answers that it produced, the survey results for Question 7a should be considered in relation to the survey comments and interview data addressed in Chapter 4 of this report.

Question 8 scored the highest of any of the nominal questions, with approximately 95 percent of respondents affirming that safety was well-handled at LANL. There were no significant differences by program.

Like all of the “yes/no” questions, the results for question *xi* were stable between the two years, varying by approximately 4 percent from 1998 to 1999. Only 13.37 percent of all interns in 1998, and 17.52 percent in 1999, answered “yes,” indicating that their work at LANL related to their thesis. However, for each year, a sizable majority—nearly two-thirds—marked that this question was “not applicable” to them.

A sizeable difference between graduate, undergraduate, and high school responses was discerned when the results were tabulated by program. In both years, close to 75 percent of the undergraduate respondents chose “not applicable” for this question. This is to be expected, as undergraduates are not generally required to write a thesis, while graduate interns must.¹⁰ A much higher proportion of graduate interns marked this question as being relevant to them, for obvious reasons, though in both years, close to one-third of graduate interns marked the question as not applicable. The differences between graduate and undergraduate interns were statistically significant.

What is harder to explain is the change in graduate responses from 1998 to 1999. In 1999, 42.19 percent of graduate interns responded in the affirmative to this question, an increase of 13.44 percent over 1998. Corresponding to this, there was a 13.12 percent decrease in the number of graduate interns responding “no” from 1998 to 1999. The “yes/no” results would seem to suggest that, on average, graduate interns in 1999 were more likely to think that their lab experience was relevant to their thesis than those responding to this question in 1998.

The overall percentage of interns that marked “N/A” was closer to the undergraduate program percentage than the graduate program percentage. This is because the larger number of undergraduate interns relative to graduate interns—approximately three times the number—pulls the overall “N/A” percentage closer to the undergraduate value.

Relationships with LANL Personnel

Another concern of the SPAC was the nature and quality of the relationships between interns and the LANL personnel who are part of the educational program. Specifically, they were interested to learn about the interaction between interns and their advisors and mentors. The survey questions that addressed this issue were numbers 3, 4a, and 14a. These questions read as follows:

Please rate the following:

3. Working relationship with your mentor.

4a. Availability of mentor during research appointment.

¹⁰ “Thesis” is understood here as denoting any large project that requires a written product, including an undergraduate honors thesis, Master’s thesis, or doctoral dissertation. It is possible that some respondents, including graduate interns who marked “N/A,” interpreted “thesis” as not including a dissertation. This possibility seems remote, however, and probably accounts for a very small percentage of “N/A” responses. Nevertheless, it would be wise for writers of the survey to include “thesis or dissertation,” or some equivalent, unambiguous statement denoting the inclusion of dissertations.

14a. How would you rate your [sic] interaction/availability of your division's Student Advisor?

All three questions are ordinal questions. The means for Questions 3 and 4a reflect a positive evaluation of these aspects of the internship program. Question 3 returned means of 1.59 and 1.56 for 1998 and 1999, respectively. Question 4a scored a mean of 1.77 in 1998 and 1.71 in 1999; the bar charts in Appendix B show the strength of these positive scores. Tabulating these questions by program did not produce any significant changes in the means between programs.

Question 14a produced a more negative assessment than the questions concerning the interns' relationships with their mentors.¹¹ The mean for 1998 was 2.51, which remained virtually unchanged when tabulated by program. This mean represents an assessment that falls somewhere between "very good" and "satisfactory." The histogram for question 14a shows its lower distribution vis-à-vis the other ordinal questions.

LANL Programs/Activities Designed to Help Interns Adjust to LANL

A third concern of the SPAC was the effectiveness of programs designed to help interns adjust to life at LANL. These include the Student Orientation materials, the Student Programs web site, the on-line application, and the student association activities. These programs were covered by Questions 9a, 10a, 11a, 13a, and 13b, respectively. Also, question 1c was a general question asking interns to rate their "overall extra-curricular experience." These questions read as follows:

9a. If you were NEW hire for the summer of 1998 (1999) and attended the New Student Orientation, was the Orientation packet you received useful?

10a. How would you rate the information provided for you at the Student Programs Web site?

11a. This year all interns completed the NEW On-line Application. How would you rate it compared to annually submitting a resume and a written employment application?

13a. Do/did you participate in any of the Student Association activities?

**13b. If yes, how would you rate them?
Please rate the following.**

**1. Overall laboratory experience:
c. Extracurricular?**

¹¹ As noted above, question 14a on the 1999 survey was scored on a scale of 1-6, making comparisons to 14a on the 1998 survey impossible.

The overall scores for question 9a are quite stable between years, with 34.16 percent marking “yes” in 1998, and 33.84 percent marking “yes” in 1999. The “no” and “N/A” percentages between years were correspondingly close. In both years, approximately four times as many interns responded positively (i.e., they found the Orientation packet to be useful) than negatively; 59.65 percent (1998) and 57.40 percent (1999) of respondents marked “N/A.” Given the wording of this question, it would appear that those who marked “N/A” were not new hires and/or did not attend the New Student Orientation. There were no significant differences between graduates and undergraduates when responses to 9a were tabulated by program.

For question 10a, the mean of all responses was 2.31 for 1998, and 2.22 for 1999. This represents a more negative evaluation than most of the survey’s ordinal questions. The responses did not change substantively when tabulated by program. Question 11a had a mean of 1.98 in 1998 (it was not asked on the 1999 survey). This mean is comparable to the survey’s other ordinal questions. There were no significant changes when this question’s responses were tabulated by program (viz., GRA, UGS, and OS/GS).

In 1998, Question 13a had 41.34 percent of interns that marked “yes,” and 55.20 percent that marked “no,” and in 1999, 44.71 percent that marked “yes” and 47.73 percent that marked “no.” Only a small percentage of interns from each year marked “N/A.” These responses were stable from one year to the next. The scores on the ordinal question 13b were also stable between the two years. The mean for 1998 was 2.36 and the mean for 1999 was 2.32, with standard deviations around one. For question 13a, almost half the respondents marked that they had not participated in any Student Association activities. It is, therefore, not surprising that 59.65 percent (1998) and 55.89 percent (1999) marked “N/A” in response to Question 13b.

Finally, Question 1c asked interns to rate their laboratory experience overall, with respect to extracurricular activities. Student Association activities were not specified, so this question cannot be understood simply as a rating of these. Rather, this question implies that its subject is “life in general” outside of official laboratory work and functions. The means for this question were among the highest (i.e., the most negative scores) of all the ordinal questions, with a mean of 2.55 for 1998, and a mean of 2.47 for 1999. In both years just over 27 percent of respondents chose “N/A” as a response to this question. There were no significant changes when tabulated by program. The high percentage of interns responding that extracurricular activities were not relevant to them is undoubtedly related to the finding that roughly half of all respondents did not participate in Student Association activities.

Results of Tabulations by Race/Ethnicity and Sex¹²

There was a limited difference between sexes in two issues: participation in Student Association activities, and the relevance of interns’ work at LANL to their

¹² Again, the sex and race/ethnicity tabulations are for 1998 only.

academic work. Questions 13a and 13b concern the first issue. Question 13a asked interns if they had participated in any of the Student Association activities. In response, 63.59 percent of women marked “no,” while only 50.75 percent of men marked “no.” This statistically significant disparity was reflected further in the scores for question 13b, which asked interns to rate the Student Association activities. For this question, 67.93 percent of women marked “N/A,” while only 53.23 percent of men did so. It is not clear why women’s participation in these activities was lower than men’s. However, the means for men and women on this question were quite similar.

Women also indicated that their work at LANL was not related to their academic work more often than men did. Questions *xi* and 2 inquired into this aspect of interns’ experiences. Question *xi* asked if the focus of the student’s work at LANL supported their thesis. While more men marked “no” than did women, more women than men marked “N/A.” (Men and women marked “yes” at nearly the same rate.) On question 2, which asked interns to rate the applicability of their LANL research to their academic course of study, 32.61 percent of women marked “N/A,” compared to 13.93 percent of men. Nevertheless, the means for men and women were again similar.

These findings are more easily understood when put in the context of women’s over-representation in OS/GS office roles. This can be seen in Appendix A10¹³ in the “sex as a percent in job category” column. Interns in office jobs were less likely to be engaged in research, thus their work at LANL was probably not applicable to any academic work that they may be engaged in. Given their over-representation in office positions, it makes sense that more women than men marked “not applicable” when asked if their LANL work supported their academic work.

The results of the tabulations by race/ethnicity were quite similar to those by sex.¹⁴ First, Hispanic participation in Student Association activities was substantially less than participation by whites. The percentage of Hispanics answering “yes” on Question 13a (Appendix A5) was 25.90 percent, and the percentage of whites was 47.46. Correspondingly, on 13b, (“Rate the Student Association activities”) (see Appendix A6), 75.54 percent of Hispanics and 53.67 percent of whites chose “N/A.” This discrepancy may reflect a greater percentage of Hispanics who are from the Los Alamos area and who were thus less drawn to participate in these activities.

In addition, fewer Hispanics indicated that their work at LANL had relevance for their academic work. On Question *xi*, (“Was LANL work relevant for thesis,” a similar percentage of Hispanics and whites marked “yes” (13.67% and 12.43% respectively), but

¹³ This aggregate information for the year 2000 was provided to us by LANL. It provides numbers of interns in program by occupational category, first for sex and, secondly, for race/ethnicity.

¹⁴ The numbers of interns in the categories other than Hispanic and white were quite small: Asian (15), African-American (8), and Native American (7). These categories were tabulated in Appendices A6 and A7, but as noted above, the small sample size for each group (similar to the HS Co-op and “Other” groups in the program tabulation) made all statistical tests result in insignificance. The remaining group in the break out of results for issue of race/ethnicity was “no race given” (58). Like the “other” category in the program tabulations, the very nature of the category renders it non-interpretable.

far more Hispanics than whites marked that it was “not applicable.” Question number 2, about the applicability of LANL research to their academic field of study, had similar results. The means for the two groups were similar, but more than twice as many Hispanics chose “N/A” than did whites. The results on these questions suggest that more Hispanics were working in jobs at LANL that have little or no bearing on academic matters. This conclusion is born out in the race/ethnicity data on the 2000 student cohort, shown in Appendix A11: Hispanics were over-represented in OS/GS office jobs, and under-represented in TSM positions; conversely, whites were over-represented in TSM positions and under-represented in OS/GS office jobs.

E. Summary Findings of the Quantitative Data Analysis of the 1998 and 1999 Surveys

In general, the results from the ordinal (i.e., non-comment) portion of the survey indicate a high degree of satisfaction among the student interns at LANL. As evident in the foregoing discussion of results, the scores for all the survey questions were generally quite positive. The questions that were scored the lowest by interns were those concerning extracurricular activities, and one regarding their Student Advisor. Questions concerning the former were: 1a, where interns rated their general extracurricular experience; 10a, where interns rated the Student Programs web site; and 13b, where interns rated the Student Association activities. Question 14a asked interns to rate the quality of their interaction with their Student Advisor.

The implications of these lower-scoring questions appear straightforward. Extracurricular activities and non-LANL-related life, in general, need improvement, as do interns’ relationships with their Student Advisors.

Findings from the qualitative data analyses reinforce and illuminate the findings from the quantitative analysis of the ordinal and nominal survey questions.

3. Methods Used for Collection and Analyses of the Intern Interviews and the Survey Comments Text Data Sets

A. Intern Interviews

The purpose of the interviews was to learn from a stratified sample of interns how they evaluated aspects of their internships and, drawing upon accounts of their experiences and suggestions, to offer the program directors detailed feedback that can inform the further development of the internship program. The report that follows is based in part on analysis of 47 in-depth, semi-structured interviews containing between one and three interns (for a total of 84 interviewees) that were conducted at LANL in August 2000.

The Sample

The interview sample was structured so as to capture the observations of five main sub-sets of interns: graduate and undergraduate, male and female, white and non-white, first-time or returning interns, in either science/technical or office/administrative work positions. The race/ethnicity category was further sub-divided into five groups: white, Hispanic, Asian, African-American, and Native American. A matrix, representing each interview conducted, and the number and type of participants, was developed to encompass the various combinations of these subsets (see Figures 2-5, Appendix C). Each sub-set was randomly filled with one to three interviewees (as available), with each interview or focus group containing only members of the same sub-set in each of the nine possible dimensions of educational status, sex, race/ethnicity (i.e., five categories), work role, and extent of LANL experience. This allowed the researchers to identify the observations of particular sub-sets of interns.

Drawing a stratified intentional sample entails over-sampling numeric minorities (i.e., in terms of their actual representation in the sample population) in order to ensure that all voices are heard. This advantage offsets the limitations of the sampling method, which precludes the use of inferential statistical analysis. As described later in this section, simple descriptive statistics are employed. The resultant interview sample (see Figure 2, Appendix C) of 47 interviews and focus groups (see Figure 5, Appendix C) was composed so as to reflect the following sub-sets:

- Undergraduate Interns: 26 interviews with 48 interns
- Graduate Interns: 21 interviews with 36 interns

- Males: 24 interviews with 39 interns (22 undergraduate and 17 graduate)
- Females: 23 interviews with 45 interns (26 undergraduate and 19 graduate)

- Whites: 14 interviews with 25 interns (14 undergraduate and 11 graduate)
- Hispanics: 15 interviews with 29 interns (16 undergraduate and 13 graduate)
- Asians: 8 interviews with 16 interns (7 undergraduate and 9 graduate)

- African-Americans: 6 interviews with 7 interns (4 undergraduate and 3 graduate)
- Native Americans: 4 interviews with 7 interns (all undergraduates)
- Science and Technical Positions: 35 interviews with 62 interns (33 undergraduate and 29 graduate)
- Office/Administrative Positions: 12 interviews with 22 interns (15 undergraduate and 7 graduate)
- Newcomers: 23 interviews with 41 interns (26 undergraduate and 15 graduate)
- Returning interns: 24 interviews with 43 interns (22 undergraduate and 21 graduate)

The final numbers in particular “cells” of the sample were determined by the availability of interns who shared the same set of characteristics. In some cases, there were no interns at LANL to represent particular sub-sets. Others had many interns that were subsequently randomly selected. The 47 interviews were, thus:

- 18 individual interviews (10 graduate and eight undergraduate)
- 21 focus groups with two interviewees (seven graduate and 14 undergraduate)
- 8 focus groups with three interviewees (four graduate and four undergraduate)

The convention adopted for the report of findings will be to refer to all single interviews and focus group as “interviews.”

Protocols and Conduct of Interviews

Interview questions were generated in collaboration between personnel in the Human Resources Division at LANL and the researchers at Ethnography & Evaluation Research, the Bureau of Sociological Research, at the University of Colorado. The result was two protocols: one tailored for undergraduate, and the other for graduate, student interns. The protocols (which are included in Appendix D of this report) were intentionally brief in order to facilitate open-ended discussions in which the interns could raise topics that they saw as relevant to the questions asked.

The interviews and focus groups lasted approximately one hour and were conducted in the manner of normal conversations so as to encourage an uninterrupted and open flow of observations bearing on as many aspects of the internship experience as possible. Protocol questions were introduced at points most natural to the conversation. The resultant intern-directed dialogues allowed the researchers to learn about the contexts that framed interns’ accounts of their experiences. Issues raised by interns in earlier interviews were also pursued in subsequent interviews. Where questions failed to provide useful information, they were abandoned. During the interview period, the two interviewers continuously informed each other of issues and patterns arising in their respective interview sessions, so that each could explore issues discovered by the other.

Confidentiality and Anonymity

Before the start of the project, the rules for the conduct of the interviews and protection of the interviewees (see Appendix E) were scrutinized and formally approved both by the Human Subjects Committee of the University of Colorado and by their LANL equivalent. Interviews were tape-recorded with the formal written consent of interviewees. The identity of those interviewed, and all data gathered by interview, are treated in strict confidence. No one, except the researchers, has access to data generated by the interviews. There is no discussion of anything said by any interviewee other than among the members of the research team. Findings from analysis of the interview data are released only in aggregate form. Illustrative quotations taken from particular interviews remain anonymous.

Text Data Analysis

The recordings were transcribed *verbatim*, yielding 1,163 pages of line-numbered transcripts that were then hand-coded by members of the research team. Transcripts were analyzed for content on a line-by-line basis. Code names (and accompanying definitions) were created to reference each discreet issue raised in the interviews and to establish the location of each segment of text in which any particular observation occurred. Coded segments were defined by line numbers and this information was entered into The Ethnograph v5.6¹, a set of computer programs designed to assist with the analysis of text data. Code words were collected into an electronic code book that increased in size as each new issue was identified and labeled. At the completion of the process, there were 4,251 discrete coded segments across the whole interview data set that were labeled with 1,516 code words. The whole coded data set was then sorted by major themes using 113 “parent” codes that were developed in order to draw related codes together.

The Ethnograph was also used to sort coded segments by sub-sets of interviewees (undergraduate/graduate status, type of internship position, sex, race/ethnicity, work role, and length of experience at LANL), to produce frequency counts of code word incidence, and to retrieve specific coded segments across all interviews or particular sub-sets of them. Patterns of codes and of code use were identified.

The purpose of ethnographic inquiry and analysis is to generate, rather than to test, hypotheses. The value of the methods described here is that they can reveal issues not otherwise predicted and clarify issues for which inquiry by survey may provide no clear answers. Whilst keeping a careful count of the frequency with which LANL interns commented on all issues discussed, neither the intentional, cellular nature of the sampling method, nor the open-ended nature of the interviews allow researchers using discovery-focused methods to submit their numeric results to statistical analysis. Frequency counts are, however, useful in identifying the relative weight of recurrent themes within and between interviews, and in alerting program stakeholders to investigate or attend to particular concerns thus identified.

¹ Siedel, John (for Qualis Research Associates), 1998. *The Ethnograph v5.6*, Scolari, Sage Publications Software, Inc.: Thousand Oaks, CA.⁽⁴⁷⁾

Code frequencies were calculated conservatively, given that, for focus groups, transcribers may not be able to distinguish speakers of the same sex. Frequency counts reported in the discussion of findings that follows are given by the numbers of interviews/ focus groups in which individual observations were made or issues were discussed. For the most part, they do not estimate how many individuals within any focus group (of up to three speakers) spoke to a particular issue. In those cases where it was possible to verify that more than one person in a focus group were in agreement on a given point, this was recorded by a specific “agree” code and was included in the count. Subsequent agreements in the same interview were not, however, counted because an earlier speaker could be elaborating the same point. Thus, speakers who repeat themselves are not accorded a higher frequency of the same observation than people with a more succinct style. The counts offered are, thus, always a conservative estimate of the frequency with which any point was made.

The reader should note that totals may not always be 100% where positive, negative, and/or mixed comments about a given subject are combined. The evaluation statements of any one person are seldom entirely positive or negative on any subject. To determine the balance of judgment on a given subject, it is not as simple as finding the difference between proportion of positive and negative statements, as very strong statements do not necessarily occur with the same frequency as more casually-mentioned comments, but ought to be weighted more strongly.

The count is conservative in one other way: because the researchers were able to interview only a sample of interns, they cannot be certain that other, non-interviewed interns would have concurred to the same degree on the same issues as those interviewed. Careful stratification of the sample was undertaken in order to discover as completely as possible the *range of issues* of concern to interns, in addition to their responses to interview questions suggested by the program administrators. It is possible, of course, that the range has not yet been fully mapped, but every effort was made to discover the total range of interns’ views by category.

B. 1998 and 1999 Survey Comments Data

The survey comments were delivered to Ethnography & Evaluation Research as part of the same *Excel* spreadsheets that contained the categorical survey question responses. As with these responses, the interns’ comments were first assigned numbers to facilitate their analysis, then exported to the word processing portion of the Ethnograph software program, which automatically formats text ready for coding.

A total of 2,131 individual written comments were catalogued in response to 20 survey questions (nine questions that were common to both the 1998 and 1999 surveys, and two extra questions that were added to the 1999 survey). This generated 143 pages of text data.

Interns’ written comments were analyzed by the same method applied to the interview data. Six hundred and seventeen discrete codes were developed to reference all

of the types of responses found in the data set. They were used a total of 3,836 times to label and locate in the text data interns' individual observations. A 'comment', therefore, is everything written by a single intern in answer to any one question; one or more individual observations may be contained within any single comment. The numbers used to report survey comment findings largely reflect the individual observations of each intern within their comment on any given question. The number of individual observations will, therefore, generally be greater than the number of comments reported in the appendices (which show the number of interns who responded to a given question).

Parent codes were generated to group the codes and the segments labeled by them into 22 major topic areas. Across the whole data set, student responses were further categorized by five criteria (i.e., within each parent code group). These were: positive and negative interns' evaluations of particular aspects of the experience; "mixed" evaluations; general statements that imply no evaluation; statements indicating interns' unmet needs, and interns' advice to LANL on particular issues. Appendix F provides an overview of the number of intern observations by type, for each survey question where comments were solicited.

As the written comments were derived from the survey returns, each set represented the accounts of experience and/or opinions of single individuals. Thus, the conservative method of counting responses used for the interview data was unnecessary, and the frequencies generated in the analysis of written comments are absolute numbers. In some instances, the numbers offered in the discussion of findings reflect all the responses to a specific survey question. However, interns sometimes wrote comments in answer to one question that are actually responses to another question. In those cases, all responses are counted and reported. This distinction is clarified throughout the report.

4. Interns' Evaluation of the Mentor-Directed Aspects of their Internship Experiences Based on Text Data Analyses

The findings that are discussed in this and subsequent sections of the report are derived mainly from analysis of the two bodies of text data: interviews with interns and interns' write-in survey comments. Reference to the survey data is made as appropriate. This section focuses on interns' evaluation of their experiences in terms of:

- its impact on their career decisions and goals
- what the interns learned
- interns' sources and levels of satisfaction with the work that they did

These issues are discussed together because they are all determined, to a significant degree, by the contributions of mentors. Interns' evaluations of their mentor-apprenticeship experiences are discussed in the following section. Evaluations of institutional and other aspects of the internship that were not directly related to their relationship with mentors appear later in the report.

A. The Influence of Internship Experiences on Interns' Career Plans and Goals

As discussed in the previous chapter, the answers to Survey Question 7 are ambiguous. Over two-thirds of interns in 1998 and 1999 responded positively when asked whether their internship experiences had influenced their career plans or goals. However, the direction and nature of this influence are unknown. Both the written comments for the two survey years, and the interns' observations in interviews, offer good clarifications of what (variously) "Yes" and "No" answers to Survey Question 7 might mean.

Findings from the Survey Comments

Question 7B, which asks students to explain their response to Question 7, received a high volume of written responses—more than any other question. It generated 273 responses in the 1998 survey, and 210 responses in the 1999 survey, and referenced 95 different issues in answer to the question (94 in 1998 and 95 in 1999). Across the two surveys, these responses contained, in total, 1,081 discrete points. Of these, 894 were evaluative statements and 187 were (non-evaluative) general observations. Of the evaluative statements, approximately 88 percent ($n=789$; 463 in 1998 and 326 in 1999) described the impact of the internship experience in helping interns to choose, refine, clarify, or reconsider their career direction and goals. This count is higher than the 70-72 percent "Yes" response in the two numeric survey questions. The difference arises largely because interns were limited to an ambiguous "Yes/No" answer to the numeric survey question, that they subsequently were able to clarify by describing one or more career-direction benefits of their internship. The 789 statements were grouped into 44 codes that reference the different ways in which interns' felt that their careers had been positively influenced by their experiences.

The two surveys, taken together, also yielded a total of 90 statements (42 in 1998 and 48 in 1999) in which interns described their internship as unhelpful, or less useful than anticipated, in informing their career direction. These “negative” statements (addressing 13 different issues) were 10.1 percent of all evaluative statements. There was a very small number of “mixed” evaluation statements (15 in total) raising six issues. Most of the following discussion focuses on the nature of the large number of statements clarifying the contribution made by the experience to the interns’ career choices and goals.

The preponderance of written responses supports the proposition that LANL internships had a strong, positive influence on interns’ education choices, existing career goals, and career aspirations. There was no difference between the two years of survey comments reviewed in this regard. This also mirrors the stability of the numeric scores for both years of the survey. Four types of statements accounted for almost half (49.3%) of the positive comments with almost the same frequency for both survey years. In these types of statement, interns reported that the internship had:

- Helped to define career decisions (1998: n=113, 1999: n=91)
- Reaffirmed previous education and career choices (1998: n=35, 1999: n=32)
- Motivated interns to pursue further education (1998: n=36, 1999: n=28), and
- Provided opportunities to explore different areas of interest and/or introduced interns to new areas that they wished to investigate further (1998: n=27, 1999: n=27)

Interns’ written assessments of the impact of the internship in confirming or clarifying a previous career path, or in enabling a decision about a hitherto uncertain career direction, help to substantiate a claim often made by the promoters of undergraduate research programs (largely offered by higher education institutions). Support for this claimed benefit is also found in the published evaluation reports of other programs that provide research apprenticeship experiences specifically to undergraduates.¹ (The career-related effects of internship programs for graduate students, or programs targeting high school students have been little studied.)

Within the four main categories of reported career-related benefits, the interns’ statements offer insights as to whether and how the internship serves these ends. The most commonly-described experiences are listed and illustrated below:

- Using the internship to discover whether one would like a particular field of work before committing to a major leading to that career
- Reaffirming that a choice previously made was indeed the right choice
- Refining their focus within a discipline or career field
- Confirming and supporting their existing career plans

¹ The evaluation literature on the benefits of undergraduate research experiences cites development of a career direction, and confirmation or clarification of a career choice, as important student gains. ^(1,3,4,5,6,7,9,10,11,18,22,26,27,28,31,32,39,40,41,43,45,46)

- Providing a rationale grounded in direct experience for a shift in a prior career choice, and reassurance that such a change is justified and appropriate:

I decided to get an engineering job to see if I would want to major in engineering or not. I have decided to major in engineering because of this summer's experience. (1998)

I realize that I am following the right course of study for what I want to do in the future. (1999)

It narrowed down what I want to do within my field. (1998)

I did not know what type of engineering program I wanted to study in college. This work experience helped me to decide that a career in mechanical engineering would be right for me. (1999)

It has enforced my desire to go into the legal field. It has shown me a couple of different types of law—some that I am interested in, others that I am not. (1999)

My career plans to be in the aerospace industry have been strengthened by my work. (1998)

Reaffirmed my desire to go into research after graduation. (1998)

My experience at Los Alamos has led me to choose a career in research rather than going to medical school like I originally planned. (1999)

Another commonly cited benefit of the undergraduate research experience (for which the supporting evidence is less strong) is increased interest in particular (science, mathematics, engineering, or computer science) disciplines as a result of the opportunity to explore new or different subject areas in a hands-on research environment.² In their written comments, LANL interns mentioned the following as a result of their internship experiences:

- Heightened interest in their field
- The discovery of new interests
- Appreciation of a wider range of options (including possible work contexts)

It has helped me enjoy computer programming more. I may switch into a computer minor....This is opening new doors and allowing me more choices. (1998)

² Increased interest in particular disciplines due to participation in undergraduate research programs is mentioned as a benefit to participants in a number of reports and discussion papers.^(1,3,4,5,9,15,18,19,20,22,23,24,26,27,33,34,35,36,38,39,42,43)

This experience has influenced me to be interested in working at a national laboratory. It has also influenced my interests in physics. I have become interested in almost all areas of physics—if I only had more time! (1998)

I see related work areas that can be investigated. Instead of simply focusing on engineering, project management can be incorporated into the picture. I found that I enjoyed what I was doing, and thus realize I am heading in the right direction. (1998)

It has opened me up to a totally different field of study that I might one day want to study. (1998)

I was introduced to applications of my major that I had no idea existed. Exciting new fields with future possibilities were shown to me. (1999)

Other evidence of increased interest, a wider sense of the options, or development of a more ambitious career aspiration is offered by interns who, as a result of their internship experience, reported that they planned to add a second degree, or a “minor,” to their existing major:

I wasn’t exactly sure what I wanted to do with my degree in Conservation Biology once I received it. I am now planning on minoring in Microbiology and planning on working with species identification using DNA. (1998)

I used to be just an elementary education major, but last year, after working in the same group under the same mentors, I decided to double major in astronomy....The more astronomy I do, the more I like it. (1999)

After I get my degree, I am very interested in obtaining a job dealing with computers and related technology. I am also thinking of getting a double major to expand my knowledge. (1998)

I want to minor in some computer field now that I have experienced the fact that computers are everywhere in the workplace. (1998)

For educators and policy makers who are concerned to increase the numbers of students pursuing graduate education in the sciences, undergraduate research programs are often promoted as a way to produce increased participation in higher education in the sciences.³ Additionally, liberal arts and “research” colleges that offer research experiences to undergraduates often attribute to these programs their record of sending a disproportionately high number of their science and mathematics majors to graduate schools. However, the validity of these connections—and the interplay of factors that lead to career-related benefits for undergraduates—has yet to be established. The survey comments are helpful in clarifying what aspects of LANL internship experiences

³ Several authors advocate undergraduate research opportunities as an important way to increase student enrollment in graduate programs in the sciences. (1,3,4,5,6,7,9,10,11,18,22,26,27,28,31,32, 39,40,41,43,45,46)

contributed to interns' thinking about their career directions, and why they found these beneficial.

In their survey comments, many LANL interns described an increased motivation to pursue a higher level of education:

I am more sure that I want to attend graduate school after this experience. (1999)

I was unsure if I wanted to go to graduate school. Now I am looking into grad schools and have been able to focus in on a specialized area to complete my Master's in. Prior to my experience at the lab, the issues were far from being resolved. (1998)

This experience has reaffirmed my desire to attain a Ph.D. in chemistry after I finish school. (1999)

This experience has helped me to decide to pursue a Master's degree in mechanical engineering. (1998)

I am seriously considering getting an MS or Ph.D. in optical engineering after I finish at UW. Before this summer I had not considered this field. (1999)

The high number of the positive write-in comments on this issue offers good support for the claim of increased interest and motivation found in the literature. It would be a useful contribution, both to research in this area, and to higher education policy, to study the processes by which these effects are created in the LANL internship program.

While interns saw their LANL experiences as shaping and bolstering their educational objectives, internships were also portrayed as offering important practical insights into the nature of the work, and of issues with which they could be engaged, as professionals. Internships were described as a powerful reality check that allowed interns to reaffirm or adjust their short- and long-term educational and career choices.⁴ Cited gains included an appreciation of what "real" research in the sciences entailed and what "real" field research required. Some interns reported an enhanced appreciation of their chosen field through the opportunity to experience particular hands-on applications of their academic knowledge. New areas of interest were also discovered as a result of working alongside mentors, co-workers, or other interns. The internship thus allowed interns to refine and focus their education and career goals in light of actual experience. What is striking about the following illustrative selection of quotations is that many of them explain not only the positive effects of the experience on their career thinking, but also how these happen:

I am interested in studying materials, and working in the materials science division has let me see how materials research is done. It has also given me an

⁴ "Learning how scientists work on real problems" is another benefit cited in the undergraduate research literature. (7,8,10,11,13,14,20,22,23,24,26,27,28,30,32,33,39,42)

opportunity to see if that is what I really like, and that it will be a good career path for me. (1998)

I have always been interested in chemistry, and now I understand how it works within a lab setting. (1999)

I feel that I have been exposed to the business world and how it works. (1999)

I have gained a better understanding of what cultural resource management is, and what type of work is involved. I have decided I would like to concentrate in cultural resource management. (1999)

It has not changed my mind about...my major, but it has helped me to learn about some of the main concerns when working with personnel issues. It has been useful because I plan to be a manager of a large company. (1999)

It has given me the opportunity to experience what a technician does in an industrial setting. (1999)

Before I worked for the lab, I did not consider research a viable career option. I was under the impression that I would not like working in a research atmosphere. I had the misunderstanding that research labs are like college labs. (1999)

Having the opportunity to apply full-time work to my educational goals and to experience the laboratory work environment contributed to future decisions on work place opportunities. (1999)

I now know a significant amount of information about what electrical engineers really do and I feel I can do this kind of work for many years. (1998)

This experience has shown me what it takes to be an environmental professional like I want to be. It gave me an idea of how far I need to take my education, and gave me valuable insight into the environmental work force and what I should expect. (1998)

This has been my first practical research position, and I believe that it has provided me with more options to consider. (1998)

It has allowed me to see all the different areas with which I can use my software engineering skills. (1999)

I was a little unsure about my major because I did not like programming in school. After spending the summer writing programs, I found I liked it much more since I was using it to do something. (1998)

I wish to pursue a career in environmental chemistry. Working directly on the Hanford Waste project, I could easily see where my chosen field could be applied. (1998)

I realize that doing biology research allows an open-ended schedule. The degree of freedom is very appealing. Biology is also a fascinating subject, and it is fantastic to see the subjects I've studied in textbooks come to life. (1998)

Equally valuable for some interns was the role played by working alongside people in particular professional fields in enabling them to choose between alternative educational and career options, or deciding to abandon an ill-grounded career choice in favor of a more informed alternative (1998: n=19, 1999: n=22):

I now know what fields of electrical engineering I do not want to enter. I feel this is half the battle. (1999)

I have learned what I do and do not like about the field I am in, which in turn has helped me to narrow my focus of study. (1999)

Confirmed that this particular area of chemistry was not what I 'really' want to end up doing. But it was okay, it didn't scare me away from the sciences either. (1998)

Experiences at this lab have had a strong influence on career plans by giving me more defined goals of what I would like to do, as well as what I would not like to do. (1999)

In just a few cases (1998: n=3, 1999: n=12), the experience helped interns to adjust or redefine their original area of interest:

I know that I want to stay in chemistry and this did most certainly help solidify that goal. At the same time, I also had a negative impact in that I realized I do not want to be doing this type of chemistry for the rest of my life. (1999)

I am in a degree program toward engineering at Michigan, but my assignment was in astrophysics (my choice) so that I could try something different. Although it was a good experience, I realized that a career path in physics is probably not suited to me. (1999)

I learned what it is like to do work in a molecular biology lab, which although I quite enjoyed my time here, helped me know that my interests are not in this exact area. (1999)

The internship experience clarified for a small number of interns that they did not, after all, want a career in their original field of interest:

I realize I want to work out in the field, not behind a desk all day. (1998)

I've got even more doubt about my desire to be in science as a career. (1998)

I know that I do not want to do Quality Management. It does not excite me the way I want my career to. It was a good job for now though. (1998)

I learned that I do not want to go into management or support staff. I would prefer a technical field position for the time being. (1998)

I don't think that I will do research full time. The goals are often too long-term for my personality, and I need more interaction with people. (1998)

I realized that space science, in and of itself, is not of interest to me. (1999)

Makes me want to stay away from research. (1999)

Material handler is not what I want to do. (1999)

I am leaving the nuclear reactor field. (1998)

There was a small number of interns who indicated that the internship had made no impact on their education or career decisions, but who described plans that were well underway before entry; these plans had not been changed or reinforced by their internship experience (1998: n=15, 1999: n=10).

A total of 12 interns (1998: n=7; 1999: n=5) said that the internship had had no influence on their career decisions: eight of these interns were working in a position unrelated to their degree or to their future career goals:

Not, it has not because although I use computers every day, it is not what I will be doing in my major. (1998)

It made me realize that this job does not give me any experience in what my future goals are. (1998)

No, because I am not working with my field of study. (1998)

No, in the sense of the field of study. I have a biology degree, yet I was working writing procedures for the training center. (1999)

My experience has not influenced me on my career plans or goals because I am not working in the type of environment that I plan to pursue. (1999)

Of the remaining four interns, three did not provide any clarifying detail as to why the internship had had no influence; and one intern was still undecided about what he or she wanted to do.

Though the numbers are small, for both years of the survey, slightly more of the interns' comments described their internship work as related to their degree (1998: n=13, 1999: n=13) than as unrelated (1998: n=10, 1999: n=7). (Across the write-in answers to all survey questions, the number of interns' describing their work as degree-related [n=31] outnumbered those who wrote that it did not relate to their degree [n=19].)

The importance of "matching" interns with relevant work positions notwithstanding, many interns also expressed the view that the internship experience had provided job training that would make them better employees regardless of where they should end up working (1998: n=18, 1999: n=3):⁵

I had ample use on a computer this summer and I enjoyed it a lot. I am not going to change my major, but computer experience will help with any field I pursue. (1998)

This internship is not particularly related to my career plans, but rather gives me some skills that will be useful for any career. (1998)

Going into this job I knew this wasn't what I planned on doing as a career. However, I have learned a lot of useful skills. (1999)

I don't think I would like to do research as a career. It seems a bit unstable. I did learn how to take initiative when need be, which will help me in the future wherever I go. (1999)

The hands-on experience of building electrical equipment, plus the advice from my mentor, has made me better appreciate the importance of developing skills that I can apply to a variety of research jobs in the future. (1999)

It has, and will certainly continue to enhance my performance and job opportunities outside of the laboratory. (1999)

I needed more office experience than I had, and working here for the year that I have, I have gained more knowledge of the office. I will need this experience in the future. (1999)

⁵ This benefit is also cited in literature promoting undergraduate research programs, both in terms of skills' training^(1,3,4,5,6,7,10,13,14,31) and as a way to enhance readiness for more demanding research, and as a good preparation for professional careers in the sciences.^(1,3,4,5,9,11,14,18,20,27,32,34,39,41,44,46)

Increased self-confidence is another benefit cited in literature endorsing undergraduate research programs.⁶ Support for these benefits was also found in interns' written comments:

This experience has made me look forward to what the working world has to offer. I have also gained confidence in the person that I am becoming. (1998)

My mentor changed my life; I gained the confidence that I need to pursue a professional career in engineering. (1999)

I feel as though this experience will further my goals and helped me realize that I can do anything I set my mind to. (1999)

Even though my work at the lab is mainly dealing with molecular biology and my projected major is chemistry-based, my work experience has given me the capability and confidence to continue studying science. (1999)

I am more confident in my ability to organize events and go through the whole planning and implementing process. I am confident that even if my major goals do not change, I have more options as to what focus I want to take with my future plans. (1998)

Along with improved self-confidence, a small number of interns also mentioned improvements in their abilities to work with others (described as gains in “people skills” and communication skills), and also an increased understanding of what it means to “be professional”.⁷

I have learned to behave in a much more professional manner because of the work I did this summer. (1999)

My communication skills have greatly improved....In turn, giving presentations and communication with my professors is all the more easier. (1998)

Learning the importance of a professional attitude in a professional setting. (1998)

Interns also appreciated the benefit to be had from working at a prestigious laboratory alongside scientists working on cutting-edge research—the opportunity to gain entry to a well-established network.⁸

⁶ Both increased self-esteem,^(11,33) and increased self-confidence—specifically, to undertake research—^(1,3,4,6,10,13,17,32,33,43,45) are cited as benefits of undergraduate research experience.

⁷ Working collaboratively^(6,7,10,14,15,19,20,35) and gains in communication skills (writing, presentation, argument)^(6,7,13,14,19,20,22,23,31,32,35) as well as professional socialization,^(14,19,33) are cited in literature as benefits of undergraduate research.

⁸ Professional networking is also cited in the literature as a benefit of working in undergraduate research.^(6,11)

Contacts developed here and experience gained, greatly eased my acceptance into graduate school (1998)

The well-connected researchers, visiting professors, and seminars were extremely helpful in choosing a specialization in chemistry and a suitable graduate school. (1998)

I was given an idea of what I really want to do as a career, and I was able to meet very good contacts that will help me in the future. (1999)

This benefit is further addressed in a later section on the prestige and reputation of LANL. Interns' comments about the consequences of having participated in an internship at LANL are, thus, positive overall, and support many of the claims made in the relevant literature of the benefits to students of participating in undergraduate research programs.

Findings from the Interview Data

The relationship between internship experiences and change or confirmation of their educational and career direction was discussed in almost all of the interviews. The positive findings in the survey comments (discussed above) are broadly supported by the interview data. However, in seeking to distinguish between the effects of the experience on graduates and undergraduates and on other sample sub-sets, the analysts found a complex situation that lacked clear patterns between sample groupings. In 44 out of 47 interviews, interns described their internships as supporting their career goals in specific ways, while in 32 groups, other interns indicated a poorer fit between their experiences at LANL and their career aspirations. There were 13 focus groups (seven with graduates and six with undergraduates) where all of the observations on the career relevance of the internship were positive, and only three groups (one graduate and two undergraduate) where only poor assessments were offered. In the remaining 26 groups, interns were divided among themselves about the usefulness of the experience in terms of their career direction, and in 14 groups (four graduate and 10 undergraduate), interns described some aspects of the experience as relevant and helpful to their intended careers, but others that were of limited utility. Thus, the overall picture offered by the interview data is one of qualified approval for the program in matching the interns' work experiences with their career goals.

A compounding factor in evaluating the effectiveness of the program in matching work experiences to career goals is that, at the outset, the career direction of many undergraduates is (as the survey comments suggest) general, uncertain, or based on limited knowledge. Uncertainty about career direction makes it difficult for the program organizers to make the most appropriate matches between particular interns, jobs, and mentors. Career uncertainties are not confined to undergraduates. Graduates in two groups reported that they had not generated a thesis topic on the basis of their internship experience as they had expected.

Hispanic interns may be slightly less satisfied with the internship experience in terms of how well it helped to clarify and refine their career choices. Only six interns in the 15 all-Hispanic interviews assessed the experience as successful in helping them develop coherent career goals. Positive assessments for this aspect of the internship were expressed in at least half of all other interviews. Satisfaction was highest among white focus groups: interns in nine out of 14 all-white interviews reported gains in clarifying their career plans.

As to whether the internships supported, or related well, to the interns' programs of study, interns in 14 focus groups (six graduate and eight undergraduate) reported a good fit between the work they did at LANL and their degree program. In eight graduate groups, interns reported a good fit between their LANL work and their thesis topics. By contrast, interns in eight groups (two graduate and six undergraduate) reported a poor relationship between their LANL experience and their education goals. Although the information on this issue is limited, the emergent pattern is one of moderate success for the program on this count.

The issue of how well internship experiences and career goals supported each other also arose in discussion of the aspirations of some interns to establish their careers at LANL. Interns in two graduate groups wished to do post-doctoral work at LANL; interns in a further seven groups (five graduate and two undergraduate) expressed a strong desire for a career based at LANL; undergraduates in two further groups seriously discussed this idea. Only two interns (both undergraduates in a single focus group) stated that they definitely did not want a career at LANL. In six undergraduate focus groups, where interns were considering another internship at LANL, the interns explained that their decision would rest on how well whatever new appointments they were offered supported their educational and career goals. In seven focus groups (two graduate and five undergraduate) interns advised the next round of incoming interns to make sure that the position they accepted served the interests of their career goals. (Three interns in one group of undergraduates stressed this.) From the survey comments data, 26 individuals expressed interest in a career at LANL, while only three said they did not want a career at LANL; eight interns voiced strong interest in returning for another internship; three wanted to return to do work on their thesis; and one intern wanted to return to LANL to do more research work. Two interns commented that they were not interested in returning to LANL for future internship work.⁹

Finally, as in the survey comments, some interns stressed the career-related value of the network contacts they had made at LANL. When asked what was the best part of their experience at LANL, people in 10 interviews (four graduate and six undergraduate) said the people they met and worked with was the best feature. This included networking contacts; it also referenced the simple enjoyment of working with people that they liked.

⁹ The intention to return to LANL for future internships is also discussed in Chapter 5, Section J.

B. Internship as an Educational Experience Versus Internship as a Work Experience

Findings from the Survey Comment Data

Interns' written survey comments portrayed the internships primarily as a work experience in which they learned things that were intrinsically interesting and/or that could be used in future work settings rather than as an educational experience *per se*. Nearly four times the number of positive statements and three times number of negative statements in the survey text data were used to evaluate the internship as a work experience than to evaluate it as an educational experience. There were 47 types of positive work experience statements contained in 830 individual observations across both years of the survey comments data.¹⁰ Nineteen different types of negative work experience were found (referencing a total of 64 individual observations), and four types of "mixed reviews" of the work experience (mentioned 14 times altogether). By contrast, only 12 codes were needed to categorize 161 particular learning gains related to education rather than to work; six codes were needed to categorize 60 negative statements about (lack of) learning, and four types of "mixed reviews" of the educational value of the internships referenced 11 individual comments. Finally, there were 12 types of observation (with a frequency of 33) offering advice about how to improve the internship as an educational experience.

Nearly twice the number of interns directly stated having had a positive work experience (n=81) than said they had a good learning experience (n=48). Many of the interns' positive evaluation statements about the internship as a work experience were general, for example:

I thoroughly enjoyed and gained much experience from my internship at LANL. (1998)

The work I have done here far exceeded what I expected to be doing. (1999)

Overall, the experience that I have had at LANL is very valuable; the work is interesting and the people that I work with are so helpful.... (1998)

I really do enjoy my job here at ESH-19. (1998)

Thank you for a very good work experience! (1998)

However, the factor most frequently cited as contributing to a positive work experience was the opportunity to "learn new things" (n=58).

¹⁰ The frequency counts cited throughout this section draw on interns' written observations about their work and learning experiences across all survey questions. However, the majority of observations on this issue were found in response to 1998 and 1999 Survey Questions 6B (on the Educational Work Plan) and 7B (on the influences of the internship), and to Question 16B ("Other Comments") in the 1999 Survey (only).

I have learned new things almost everyday and broadened my horizons in technology.
(1998)

I believe this work experience will be a great influence on my career plans and goals because while working here I have learned a lot. (1998)

I learned and experienced far beyond what my expectations were. (1999)

I work for a group of nuclear engineers and that's so much help to me. I have learned so much about all different kinds of engineering. (1999)

Thus, interns' positive assessment of their work experience was often linked to the opportunity to learn:

I have found my position here to be very rewarding...I enjoy coming to work and am consistently challenged by new responsibilities assigned by my mentor.
(1998)

Most comments about the benefits of working at LANL were, however, more specific. As discussed earlier, over 70 percent of the interns' survey responses in both years indicated that the internship had influenced their education and/or career direction. However, the nature and direction of this influence was not always clear. They became clearer in analyzing the survey comments. Some interns valued the internship because it helped them to decide on a career direction; others stressed its utility in confirming their choice and adding to their pre-professional knowledge, skills, and contacts:

This is a great program and it has done nothing but help me in my career choices.
(1999)

It has given me some good experience with which I can better judge my interests for employment here or elsewhere. (1998)

This was an excellent opportunity for me career-wise. I can build on my experience here, and learn from it, and apply some of the knowledge to my future, wherever I may end up. (1998)

I planned to get my master's in CS and go to into bio-informatics. This program really sped those plans up and made them much, much easier to attain because of the resources available and the work opportunity. It's an excellent program.
(1999)

In expressing a positive opinion of their work experience, interns also mentioned the importance of a good match between the work to which they were assigned and their own area of interest (n=31), and/or their career goals (n=14). Thus, a good work experience and a good learning experience converge in a positive assessment of the

internship where interns are given a relevant job placement. Good matches were seen as especially important in consolidating and enabling existing career choices:

This experience has been wonderful because it deals a lot with what my major is...I've learned so much by working here and taking courses at the same time. So I feel I learned twice as much. (1999)

Challenging in areas in which I needed improvement while utilizing my areas of 'expertise' and interest very well. (1998)

The work experience is perfectly adequate to the goals and plans I have. (1998)

Mine fits exactly right with my graduate program. (1999)

My major is experimental nuclear physics....Now I have experience in this field, and I would like to continue my research in this area. (1999).

I like my field and my project was in direct line with my interests. (1999)

This experience reinforced my choice to go into a medical profession. I have chosen pharmacy because learning and working with finding different options for people to use for disease is important to me. (1998)

Other factors mentioned as contributing to a positive work experience also blur the line between its benefits as a work experience and as an educational experience. Factors cited as contributing to good work experiences included:

- work that was personally "challenging" (n=13):

Met my expectations and was very challenging. (1999)

I was given a whole project to myself to design and build a data signal-processing simulator. It was a challenging and great learning experience. (1998)

It [the Educational Work Plan] is pretty accurate and challenging. But I like challenges. (1998)

I gained a lot of new knowledge and brand new insights. I was always challenged. (1999)

- work situations in which the intern worked independently and had some control over the type of work they did (n=13)

The work plan was presented to me in a way that allowed me to accomplish the goal in my own time as well as learning a great deal on my own along the way. (1999)

- work that was “meaningful” because of its potential to “contribute to science” (n=10)

The work my group is doing with supercritical fluids is on the cutting edge of today’s technology, and I got to be a part of it. (1998)

My experience here at LANL opened my eyes to research, experimentation and development that I feel is often overlooked in society. I feel fortunate to have had the opportunity to work within a realm of technology that is actually planning for the future. (1998)

It made me see that there is important work to be done by people who have a passion and commitment to quality waste management. I think I’d like to work in this field rather than college instruction. (1998)

I would like to continue to do research, where I can discover things that have never been discovered before. (1998)

- work that offered a variety of job tasks and learning opportunities (n=8)

I really enjoyed my work plan because it had a lot of variety. I learned a lot about the potential applications of my schooling. (1998)

...It was nice to be able to choose from several different kinds of work and do the things that I wanted. I liked having several things to work on. (1999)

It was nice to do various assignments utilizing my many different skills. (1999)

Interns also wrote of acquiring new skills—again often in general rather than specific terms. These were seen largely as practical benefits that would be useful in future employment—either in a specific field, or more broadly—and that would make them more attractive to prospective employers:

Going into this job, I knew this wasn’t what I planned on doing as a career. However, I have learned a lot of useful skills. (1998)

By receiving this experience, I’ve taken into consideration the various applications of the skills I’m learning in college and obtaining here at LANL. (1998)

My internship this summer has allowed me to realize the skills that labs and companies are currently looking for.... (1998)

I want to learn as much as possible on this area of interest and to continue to work at the lab to use my skills that I learn. (1998)

This internship is not particularly related to my career plans, but rather, gives me some skills that will be useful for any career. (1998)

Learned a lot of helpful information and skills. (1999)

I gained some excellent skills for my future career. (1999)

Where interns do mention specific learning gains, they largely reference computer skills (n=18):

Through the computer experience I gained, I can see a possible career for me in computer science. (1999)

During my term at the lab thus far, I have developed advanced computer skills that I plan to expand further with my graduate degree. (1998)

I used this summer as a way of learning a lot about computer programming, and gained enough practical knowledge that I hope to avoid taking any CS classes in college. (1998)

I learned new programs on the computer, such as Primavera Project Planner. (1999)

Other specific learning gains mentioned included learning to work with others, and improved communication skills (n=10):¹¹

Expanded knowledge, learned experimental approach and design, and how to work with others. (1998)

It has helped me work with people who I may or may not get along with. (1999)

I learned a lot about what it is like to work on a team. (1999)

My communication skills have greatly improved....In turn, giving presentations and communication with my professors is all the more easier. (1998)

Interns also evaluated their work experiences positively where they were enabled to make informed educational and career choices. The internship experience helped interns to reach decisions through access to information and experience that had allowed them to:

- Develop a real understanding of what work in their field would be like (n=83)
- Reaffirm existing education and career objectives (n=67)
- Explore other areas of interest (n=56)

¹¹ As discussed in an early section of this report, some interns also mention affective gains as a result of their internship, such as increased self-confidence and a greater sense of professionalism.

- Refine chosen areas of interest (n=53)

Positive evaluations also included some detailed accounts of how the work related to particular fields of interest—again stressing appropriate job placement, what it was about their work that was challenging, the degree to which they were encouraged to work independently, whether the work was seen as contributing to the greater good of society, and the variety of work available to them.

When offering negative evaluations of their work as interns, the respondents characterized poor work experiences as:

- Working in positions that were unrelated to their education or career interests (n=29)
- Performing boring, repetitious, and non-challenging “busy work” (n=22)
- Feeling useless because they had insufficient or no work to do (n=14)

Aside from providing a poor work experience, such situations also did not offer interns an opportunity to learn anything useful. Interns’ strongest criticisms of the internship experience referenced either boring or repetitious job tasks, or not having enough work to keep themselves occupied:

This job consisted of doing the same thing all day long for the whole summer: just entering data into the computer. I found it extremely boring and hard to concentrate on. The time would have gone by faster if we had different work to do. (1998)

Work would have been great if I had had something to do. (1998)

Work plan was formed to make it look like I would have sufficient work and meaningful tasks, but turned out to be wordy description meaning ‘We will find something for her to do.’ (1999)

I would suggest hiring students because you need the extra help, instead of hiring students to just sit around and play on the computer. If I ever got any work to do, it was because I had to personally ask for work, and it was just busy work anyways. (1999)

I didn’t do any exciting work this summer. (1999)

I would like to work more with information systems. Right now I am just doing simple data entry. (1999)

I really didn’t feel any challenge with the project I was on! I don’t know if they expected someone that had no experience or what. (1999)

What was described to me as the work plan and what I did were not the same. Again, all I did was the same task over and over, thus learning very little. (1999)

I was never really given a work plan. I was just shifted around on little jobs, often just given books to read. I get the impression...books were just methods of wasting my time. (1998)

Interns' who were displeased with their work experience because of a lack of work, occasionally linked their negative assessment to poor mentoring:

My mentor was not expecting a summer student, and so was not available for much of the time....Overall, my impression was that my presence was not at all required. (1999)

My mentor hired a lot of students...but he didn't have anything for us to do. He was just the source of funding. He then sent us out to work for other people. I feel like I wasted the first month I was here because I didn't have anything to do. (1998)

I am not happy with my experience at the lab. My job was boring, my mentor was not around very much.... (1999)

Some interns providing negative accounts of their internship experience were working in an area unrelated to their education or career interests:

I wish that my work plan would have been more challenging and that it had more to do with my major. (1998)

This job does not give me any experience with what I plan on majoring in. I wish that I could have some experience with a similar field that I am majoring in. (1998)

I didn't do anything or learn anything that would help me with my future career. (1998)

The job did not apply to my area of studies and did not help with my career plans. (1999)

When a student lists what they are interested in, that should be taken into consideration. I really disliked most of what I did. (1998)

Some interns stated that the internship was unrelated to their goals without offering further elaboration about whether the internship had been a good or bad experience (n=9):¹²

I knew coming into this job that it would have nothing to do with my field of study. (1999)

¹² This type of answer occurred in response to survey question 7B (1998 and 1999) about the influence of the internship on their career decisions.

My job has little to do with my education. (1998)

Did not pertain to engineering. (1998)

I knew before I got here that what I would be doing would only vaguely have anything to do with my major. (1999)

Finally, while having an Educational Work Plan (EWP) in place gave interns a good indication of what their job functions would be, not having an EWP, or ending up doing work different from what was expected, did not always lead to dissatisfaction with the internship. (Interns' evaluations of the Education Work Plan system are discussed in Chapter 5A.) Two interns whose placement was unrelated to their career or education interests nevertheless expressed a positive view of their work experience:

Although I don't plan on going into HR in the future, the experience was great, and the work was great. (1998)

The work has little to do with what I studied in college, but has been very interesting anyway. (1999)

Notwithstanding the small number of serendipitous outcomes, it is clear from the survey comments overall that internships gave greatest work satisfaction where interns saw some connection between their work and their broad educational and career goals, when they were given the opportunity to learn something new, and when the utility of their work to the department or project was clear. A tight connection between interns' assigned work and their entering career aspirations does not seem to be absolutely necessary because interns valued the opportunity to clarify, refine, and redirect their goals based on information acquired and new fields encountered during the internships. Unlike undergraduate research programs to which these internships may be compared, the survey comments do not indicate that most interns made educational gains, such as understanding the nature of "science" and the research process, or the theoretical underpinnings of their work.

Findings from the Interview Data

The interview data both mirror, and amplify, the findings from the survey comments data (as well as the quantitative findings from the survey analysis). In 25 of the interviews (including 52 individual responses) interns gave positive assessments of the value of the work they were doing and the level of interest that it held for them. Satisfaction with their work was expressed in a number of ways:

- Valuing what they did and appreciation of the opportunity to do it: feeling that their work contributed to important outcomes gave their internship a sense of purpose
I definitely feel that my work has made a difference—and they're letting me know that. The thing that I'm working on, it's due-date is in a year, and everything I'm doing is going to be part of it...It's like I've been given the right

tools to collect the proper data with the work that I've done...I definitely feel that what I do is relevant.

- Appreciation of encouragement received from mentors or colleagues to explore their own ideas and to make suggestions that could shape the direction of the work
- The sense of doing real science in a professional environment:

Getting me into the workplace and professional atmosphere is what it's all about.

Positive evaluations of the nature and utility of their work were more strongly represented in undergraduate interviews: they were offered in two-thirds (17 of 26) of the undergraduate interviews compared with only one-third (eight out of 21) of the graduate interviews. Positive responses were, otherwise, broadly proportionate by race/ethnicity, sex, job category, and length of experience at LANL.

Where work was judged by its nature and perceived significance, negative evaluations were offered in six undergraduate interviews and three graduate interviews. These interns did not find their work sufficiently challenging, and were not, thereby, motivated to learn more; some described their work as unnecessary and repetitious. Mentors were faulted for failing to arrange meaningful and appropriate work that would make the experience beneficial both to the intern and to the project or department:

The lab has a tendency to underestimate their students' capacities. And, along with some of my friends here, we realized that we're not being gauged properly. I can handle a lot of things and know how to do a lot of things, but, unfortunately, they don't seem to know or understand that—so I turn out very little work.

This type of response was broadly proportionate across the sample by race/ethnicity, sex, job category, and length of experience at LANL. However, all three focus groups in which mentors were thus criticized were composed of Hispanic undergraduates.

In 10 interviews, interns expressed satisfaction that they had plenty to do and, more importantly, plenty to learn. These interns were not only "busy," but saw themselves as productively occupied and (in some cases) self-directing:

Well my group has taught me a lot of different things. They put me on small jobs that normally last two weeks or so—like, for the first week I was doing temperature, and the second week, simulations. And they're teaching me a lot on a very broad scale.

They keep me pretty busy. Before I finish one thing, they have me started on another. It sounds like it would be pretty annoying—but it isn't. What would be annoying would be to sit around in the office with nothing to do.

These 10 interviews were proportionate across race/ethnicity, gender, and length of time at LANL. This type of positive work assessment was (again) offered only by undergraduate interns. Job category may also be relevant to satisfaction by this criterion: eight of the interviews were with undergraduates in science and technical positions and only two with those in office/administrative roles.

Undergraduates also provided most of the negative assessments of their work when defined in terms of its pace and load. Overall, there were more negative than positive evaluations: over one-third of all interviews (18 of 43) contained 38 comments that specifically addressed problems with the volume and pace of their work. Positive responses were offered in 13 comments in 10 interviews. In 14 undergraduate, and also four graduate, interviews, interns offered a total of 38 observations on the uneven flow of work: sometimes they were very busy, but were often left with nothing to do. These interns did not feel that their work was useful and often felt bored and direction-less:

But it's just so numbing—monkeys could do it.

Sometimes, you get really bored. Like, I'll just take the four-wheeler and drive—go four-wheeling at the back of 52, just because I don't have anything else to do.

I enjoy some of the work that I'm doing. I just wish that I could get more of it.

These interns felt at the mercy of unpredictable project schedules and had no sense of control over the nature and pace of their work. They wondered who was responsible for distributing work and establishing accountability for productivity:

I've seen a lot of people with nothing to do. It's not that they're slacking, or not doing their job—they just don't have anything...They just sit at their computer and stay out of trouble—try and make it look as though they're busy.

And the thing that surprised me most about this internship is when I walk by someone's office every day and see them reading a novel, I'm wondering what their job title is, and what they're supposed to be doing, and how they are able to do that and not be accountable when the time comes and somebody says, "How's this project coming?" I see it every day and it drives me nuts!

There's a lot of people that are constantly moving, and you can see they're always involved, and they're getting things done—they've got three different irons in the fire at all times. But there's other people that don't seem to have a lot going on, and you're wondering if they're actually working—if they just have office space somewhere.

Exposure to these inconsistencies was a negative experience for this group of interns. Some interns explained as one source of these problems the uneven distribution of staff between departments. They described their department as understaffed, given the volume of work they were expected to handle. Thirteen of these 18 interviews were composed of

first-time undergraduates and graduate interns who had worked at LANL for less than a year. No other patterns were noted.

Time-related factors played a role in interns' discussions of their work satisfaction in two other ways. In seven interviews, interns had found the length of the internship too short to get an authentic experience of hands-on science, to complete the projects on which they were working, or to feel that they had contributed anything of value.

In six interviews with graduates (and one with undergraduates) interns had found it difficult to balance the competing time demands of school, family and social life with their internship responsibilities. The limited time for summer internships was also a factor contributing to the ability to get work done. These observations highlight essential differences between graduates and undergraduates in the significance of their internship. As discussed in findings from the survey comments, undergraduates largely stressed the benefits of the internship as a work experience that can be inherently interesting, and/or that may further their educational and career goals. This distinguishes them from most undergraduates in higher education undergraduate research programs where the focus is more clearly educational. Graduate students have a higher level of investment in their internships which are essentially linked to their educational and career objectives: their choice of LANL as the locus of their dissertation research inevitably involves commitment and risk in the use of their time.

"Learning" as a positive aspect of the internship was mentioned in almost all of the interviews (i.e., 38 of 47), particularly among undergraduate interns (22 out of 26 undergraduate interviews, compared to 16 out of 21 graduate interviews). However, many of these positive assessments are (as with those in the survey comments) non-specific, or reference work-related learning, rather than educational gains.

Again, as with the survey comment writers, the interviewees spoke of exposure to new ideas, research or disciplinary areas, the application of knowledge, and learning through exposure to "real science":

I like the science best because it is really good work. The opportunity to work here is great and I would definitely recommend it for that.....I kinda look forward to going to work, and I tell my friends, 'It's so cool; I'm learning this. I just did this today.' So, I mean, I really enjoy the work.

When you work here at the lab, it's so wide, and there's so many different groups and so many things going on, that you learn a lot. You get a really broad education just from the work.

What I'm trying to do with applied math in the industrial setting is a great opportunity, because I get to see how what I am learning is being applied. I think it's been really great.

However, much of the learning cited was linked to practical objectives—awareness of the value of new knowledge and skills in a changing job market, and an expanding awareness of what career alternatives were available:

There's a good market for people in technical areas...I've had other opportunities, but I have always felt that they really weren't much of a gain over being here.

I'd like to learn the laboratory, learn the systems on the financial side...I think there's a lot of opportunities there, but I don't want to pigeon-hole a single one until I have a better idea of the laboratory, and how each one works, and where the career opportunities are for each division.

Also, as in the survey comments, interviewees appreciated the new skills they had learned, and undergraduate more often than graduate interns described new skills as a benefit of the internship (i.e., 18 out of 24 undergraduate interviews, compared to 6 out of 24 graduate interviews). Again, computer skills were the most frequently mentioned, but social, professional, and research skills were also cited:

I've got a lot of confidence in this whole job—being able to learn all these computer programs, and working with people. I mean, that alone has been really helpful to me.

One important thing for me is getting access to the types of computers and software they have here—I don't think there are many other places that offer a chance to learn such skills. And I was also able to run some of my research experiments on these computers, so that's an extra bonus.

I love exposure to lots of different things...You get experience not just in the project that you're focused on, but as a consequence of collaborating internally within the department. You get to learn a lot of new things.

Well the knowledge is important, and I've learned a lot of really good work habits too. I had worked before I came to the lab, but it was different, I guess. I'm learning good work skills—I can also do things faster now.

A largely undergraduate subset (17 of 23 interviews) also spoke of their overall experience at LANL as “a learning experience.” The internship was described as a learning experience in only six (of 23) graduate interviews. Where specific learning gains were mentioned, they included working in a cross-disciplinary context, learning interactively from co-workers, the importance accorded formal presentations of work, and seeing the application of theory in action.

It's more interactive—and that's the stuff I like the most. I can learn a lot from a book, but I like the whole Q and A atmosphere.

It's a nice balance. In schools, a lot of times, they feed you theory, and hand you the equation...And here, well, you come up with your own explanations.

Finally, some interviewees who described their LANL experiences in terms of learning gains explained that the internships tended to promote independent learning. These interns had found themselves required to take on a certain amount of responsibility for work completion and quality, were expected to show initiative, and to be assertive when necessary in asking for what they needed to get the work done:

If you know the work that you're going to be doing, there's usually a lot of reading to do to get familiar with it. That way, it won't be like a bucket of cold water. You kinda get an idea—a feel for it, so you'll pretty much know how to work on your own and not be waiting around for somebody to tell you to do this or that.

You can, a lot of the time, just solve problems on your own—which is what I've kinda learned to do this summer.

It's really a good experience to be by yourself and confront your problems and solve them. Sometimes you spend one or two days trying to find something and finally, you get the answer, and it's great. Honestly!

They pretty much throw the responsibility on us. You go in there and make changes on the server, or you take responsibility for your actions. You have to think about what you're doing—it's like a real life position—you're in charge. And I'm in charge of back-ups—if I can't be there, I am responsible to have someone there to cover...And if I take the initiative to change something, I had better make sure that it works.

Reports of growth in independent learning were evenly distributed among undergraduate and graduate interviews, and by race/ethnicity, sex, and length of experience. However, far more of the interns in science and technical positions (18 of 19 interviews) than those in office and administrative work (1 of 19 interviews) reported that they had learned to work independently as part of their internship experience.

Negative evaluations of the internship related to learning were offered in almost half (21 of 47) of the interviews (seven of 21 graduate and 14 of 26 undergraduate). In addition, eight of 18 individual interviewees (five graduate and 13 undergraduate) who offered positive statements about their learning gains also commented on the negative contribution to their learning of some aspects of the internships. Negative statements about learning clustered around four main issues.

1. *Training* was an issue only for undergraduate interns. Those who commented negatively about their training thought that the information offered was too great in volume for absorption, insufficiently relevant to particular areas of work, was poorly communicated, and/or took too long:

Some of this stuff is so ridiculous—like you have to do ladder training before you can get on a ladder and change a light bulb. How ridiculous is that? And electrical training so you can plug in the computer—really silly things like that....Every once in a while there's a person that's not careful, and that's why they have to make all this training because of that one person.

Summer interns especially thought that the large amount of time invested in training left insufficient remaining time for actual work:

There's a problem with all the requirements that have to get done before you can get started. I would think they should have all those things done in the first month you are here so you can at least get two solid months of work done. But, since they have us doing things here and there, it takes away time from what we need to do.

2. *Orientation* also received negative evaluations for the presentation of information seen as lacking consistency from session to session, offering unnecessary information, or belaboring points on some issues, but lacking depth on issues important to interns:

There's an orientation to every single thing. I mean, there's an orientation to use the gym; there's a general orientation when you come here; then a safety orientation. And it just keeps going on and on, and a lot of it is so obvious. If they didn't have it, I suppose they could be held responsible, but a lot of it is common sense. Why spend so many hours on something that could be done in half an hour?

There's certainly lab-wide orientation, but that's not stuff you need on a day-to-day basis. I mean, I don't think about my benefits, and what I do when I want to leave and things like that. It's what I'm working with everyday that I need the orientation for.

3. *Procedures/Stand-downs* (including safety and security procedures) were seen as unhelpful learning experiences because they were seen as irrational, time-wasting, impractical, "creating double-work," and interrupting the regular work-flow. Some undergraduates interns may not sufficiently have internalized lab norms so as to be patient with the safety and security concerns that shaped what they saw as unwelcome learning sessions:

Stand-downs! Those are way too long. I don't mind going to a class here or there, or a meeting for a couple of hours. But, it was, like, three days. And if you didn't get a really good night's sleep before you came in, it was really hard to stay awake, because it was so boring.

I had something like two weeks of reading for all the procedures—so if you have two weeks of that, plus two weeks of the fire, it's a month. And this internship

was supposed to be four months, so you cut off four weeks and now I have to work harder and quicker.

I think they need to streamline the whole process if they want to keep productivity up. I was complaining about this to my mentor that I found it really, really annoying—the general lack of productivity because of all the rules and regulations....And his answer was, the current culture of the lab is safety first, security second, and productivity a distant third.

Observations on safety training, and on the level of safe practice in their work setting (as reflected in survey comments in answer to Questions 8A and 8B) are discussed separately in Chapter 5I. Changes in the safety procedures and concerns are also discussed in Chapter 5H with reference to the Los Alamos Fire.

4. *Nature of the Assigned Work.* As indicated in the discussion on interns' dissatisfactions with their work assignments, some interns felt that they were denied learning opportunities because their jobs seemed simply that, and no more—just a job. Their work lacked any educational content, intrinsic interest, or intellectual challenge:

I would make sure there was work for students to do—not just hire them and stick them in an office and give them rinky-dink jobs to do. ...I was stuck in an office making binders—putting tabs on folders. It wasn't helping me learn anything—and that's what the student program is supposed to be—a learning experience.

Some summer interns had found the period too short to learn anything from their work. Some graduate interns felt excluded from particular learning opportunities (especially, traveling with their research group to make a formal presentation of work in which they were closely involved).

Separate from their evaluations of internships as opportunities to learn, some interns offered advice to the program organizers and mentors—and also to future interns—about what could enhance the internship as a learning experience. As discussed above, many undergraduates—especially those in office and administrative positions—had experienced difficulty in setting up their internships in ways that made useful connections between their work and their academic and career goals. In 11 of the 15 undergraduate interviews, interns advised those who followed them to focus on establishing these connections from the outset, especially in discussion with their mentors. (This was less of an issue for graduate interns—only four of whom offered this advice.) Beyond that, they advised learning as much as possible about the context of the work they did and its connections with other departments. They also encouraged their successors not to be afraid to ask questions, express ideas, and make mistakes.

Those undergraduate interns who were either thinking how the experience could have been improved, or were thinking about returning, commented that they would like to learn more from the internship. In line with the way that the internship is primarily

seen—as a work experience—the majority of these observations focused on getting a wider experience—perhaps working in a different division to expand their range of options. The aspirations expressed by this undergraduate group that specifically referenced educational goals, focused on their desire to learn more about the research process, to learn more independently, and to better understand the theoretical framework on which their work was based:

I would have done some things differently. I would like to do more experimenting—try to figure things out on my own before I went and asked someone. I mean, it's better to go and ask, but, if I could do my own little experiments and tried to work it out by myself, I think I would have learned more.

I might have done some things differently. I would have probably concentrated more last summer on developing a better theoretical background, because, this summer, I'm catching up on that.

You know, sometimes it's hard to come here to do research—to learn the basics of how you do a research project, and how to carry it through —how to make it work. I've thought about that a lot.

C. Interns' Evaluations of the Contribution of Mentors and Student Advisors to Their Internship Experiences

As with other programs intended to give graduate or undergraduate students a research apprenticeship experience, or a work experience that encourages them to consider a career in the sciences, success greatly depends on two important factors:

- How well the mentors taking part in the program understand and fulfill their role expectations, and
- How well the interns and their mentors are matched, especially with respect to the career and educational goals of the interns

These qualifying conditions depend in turn on how participating mentors balance the educational and career benefits to the interns with the interests of their research or the work of their unit. In the interviews, therefore, the evaluators asked interns to discuss the quality of their working relationship with their mentor and its impact on their level of satisfaction with the internship.

The interns' observations fall broadly into two types:

- **Formal Role:** How well mentors fulfilled their formal duties to their interns—the level and nature of access, communication, direction, and support for educational and career goals experienced
- **Informal Role:** How the quality of the personal and professional relationship between interns and their mentors affect the interns' evaluation of their overall experience

This distinction is also reflected in survey Question 4a (on the mentor's availability to their intern) and in Question 3 (on the quality of the intern's working relationship with their mentor). It is also addressed in 390 written comments in the survey returns. The following section includes findings from both the interview data and from the analysis of students' write-in comments from the 1999 survey (the 1998 survey did not solicit interns' comments about the availability of their mentor). The interns' overall assessment of the mentoring they had received was, by all indicators, positive. The write-in comments yielded 290 positive and 64 negative assessments, and positive individual statements about aspects of interns' working relationships with their mentors were offered in 44 out of the 47 interviews.

The Mentor's Formal Role: Access, Communication, Effectiveness as a Supervisor, and Support for the Interns' Educational and Career Goals

In 37 interviews, interns reported that communication with their mentors was working well (with no differences between interns by educational status, sex, race/ethnicity, job type, or length of LANL experience). Getting good access to their mentor was the primary need:

When you're first there, it's very important that you see your mentor for some time every day. You really need to be in contact with that person and see them working, and then you try and help out yourself.

In 29 interviews, interns reported good access to their mentors: in 10 interviews, interns said that they saw their mentors every day, and in two others, interns reported daily e-mail contact. Physical distance between the regular work sites of intern and mentor was not necessarily a problem when a mentor took his responsibility to maintain contact seriously:

He works in [Building X] and I work in [Building Y], so we cannot—well, I can take a taxi over there. But when I send him e-mails or try to call him, if he's not in meetings, he will always listen to me. If he is in a meeting, he'll say, 'Well, I can't talk now. Why don't we meet this or that day.' It really works well.

In addition to adequate access, interns defined as "good," communication that was comfortable, two-way, open, and (of especial importance to graduate students) collegial. Undergraduates wanted their mentors to listen and to understand (and make allowances for) their limitations as early-stage learners:

You want them to understand you're not going to learn everything right away, 'cause there's so much. And you want them to have the understanding that, if you make a little mistake, it's okay—you're just learning.

Being treated collegially by people with superior education and experience (whether by their mentor or by other co-workers) made a strong, positive impression on those interns who experienced it, and bolstered their confidence:

That's another nice thing about the lab in comparison to other jobs...When I worked at the hospital, a doctor would come and smash you down because you don't have a doctorate...(At LANL), people like to treat people equally, and that makes the work environment nice because it gives you a lot of confidence, saying, 'Yes, I can do this.'

This effect was (as in the instance cited above) especially powerful for local students of color with limited experience of working with highly-educated professional people.

In 18 interviews (11 undergraduate and seven graduate), interns described their mentors as engaged with them as teachers and/or academic advisors. The mentor-as-teacher was described mostly by undergraduates (in 10 undergraduate interviews and one with graduate interns):

I learned more than I have learned in a long time in such a short experience, and it was because she took the time to teach me about what I was doing, and really made me understand the end point. I think that's important. If you understand the goal you are trying to reach, and you are actually excited about it, then it's easier to do the work.

The best way that I can put it is that I think my mentor actually coached me rather than managed me.

I assumed that I'd probably be doing mostly desk work, and stuff like, 'Bring me some coffee.'....But I'm actually in the lab taking measurements—doing things that are important....What I was hoping for—and how it turned out—he helped me understand the concepts, and explained to me what I'm doing and why, and the physics behind it.

Interns also expected their mentors to take an active interest in their educational and career goals. In two graduate interviews and one with undergraduates, interns described how their mentor had helped them to develop a thesis topic, and in three further interviews, graduate interns reported that their mentor and academic advisor were working together to enable aspects of their education or career-planning. In five more interviews (four graduate and one undergraduate), interns explained how their Education Work Plan had been developed in collaboration with their mentor. A function of parallel undergraduate research experiences in university or college settings that are commonly referenced in the literature as helping students to decide what they want to do, or confirming a choice of career direction that they had already begun to form. This was described by LANL interns as an important aspect of their experience—one to which mentors could greatly contribute:

It's a good place to work, especially if you don't know what to do, or even if you do, you know—even if you're set on this goal...."Cause the learning process is huge—you can learn a lotta things with your groups, and especially if you have a great mentor. I think that's probably the key if you're not too sure what you want

to do...That way you can explore things...And there's a lot of freedom here to do what you want to do, or what you need to do.

Ten of the most frequently offered types of write-in survey comments were those that described mentors who performed their roles well. In 212 individual observations, students described how their mentors had contributed to good work experiences: they had provided clear explanations of the work expected, good guidance as they learned new work skills, had supported and extended their learning, were helpful, accessible, willing to answer questions, and enjoyable to work with:

I thought the hands-on experience that I received from the laboratory was excellent. [He] was informative and was able to explain everything we were working on in depth and at a level that was understandable. (1999)

[He] is one of the best mentors available at this laboratory. He gives work that is challenging and interesting and applicable to my field of study. (1999)

The mentoring experience was very informative and positive. My mentor was very helpful and eager to help out with my research needs. (1999)

My mentor and I got along very well. He allowed me to complete my given tasks, with help from him or others whenever I needed it. (1999)

My mentor...is a very kind, down-to-earth kind of person. She allowed me to voice my concerns and always lent an open ear. (1999)

By contrast, in 18 (out of all 47) interviews interns spoke of problems with their mentors. Communication problems with mentors were, again, defined in terms of access, quality and effectiveness of communication, individual effort, or collaboration with advisors to enable interns' educational objectives. However, the primary unmet need was for regular access to their mentor:

You want them to be available. You don't want a mentor that you're not going to see—that you're not going to be able to get in contact with. You want somebody that's there...and that's not what's happening

But, as for knowing what was expected of me, he's never told me. I just assumed what I need to do, and if I have a problem, then I go to someone else. He comes to me twice a year and says, 'I want a report on what's you've done and where you are with your project,' and that's about all I've gotten from him. And you do NOT go to him—he gets upset when you disturb him...the undergraduates are all completely afraid of him and we never go near him.

Maybe just a weekly meeting to sit down and make a time-line of, 'Here's where I want to go. How does it coincide with my education? If I wanna become an XXX, these are the steps I would take....' It's sort of on his mind. We tried to do

this near the end—but we never laid it out, and it felt like an empty promise. So, I think, having those weekly meetings and really planning it.

In nine interviews (four graduate and five undergraduate) interns described the quality of the contacts with mentors as “poor” in that it was ineffectual, unproductive, involved the mentor “talking down to the intern,” or that the mentor had given the intern insufficient guidance:

I feel that I’m working as a post-doc more than as a graduate student because post-docs are expected to be self-directing, whereas graduate students tend to expect more interaction. Okay, your boss doesn’t know what the answer’s gonna be, but they should, at least, know how to approach the problem, and give you some hints... We touch bases once in awhile, but it’s not often.

If this is going to work, I have to make it work... I don’t think it’s a bad thing, *per se*, because you learn to think independently and do your own thing—which you’re going to have to do anyway. But I think things could have gone more smoothly and could have been done in a more timely fashion... The three principle investigators... they’re all extremely busy, so I can’t say, ‘Hey, let’s sit down and talk about this concept until I understand it.’ So, I have to go and dig through a stack of scientific papers and slog through them for a while and maybe get the same information, but it takes longer when you do it that way.

What’s the point in the student program if you don’t have somebody to help you? Basically, he pulled me into his office and said, ‘Oh, by the way, if anybody asks, I’m your mentor.’ And that was it.

I don’t think we spend that much time together or that I get a whole lot of direction. I finally figured it out that you have to be self-directing here.

Interns—especially graduate interns—did not expect to be “spoon-fed.” They distinguished between reasonable expectations of access, regular communication, and guidance with respect to the work and over-dependence on the mentor:

I think, as long as they’re there to answer your questions and to point you in the right direction, they are doing what is needed. I don’t think they’re there to babysit you. I think they’re there to assist you, give you the work, and help you learn as you do your work.

Interns also distinguished between mentors who were insufficiently active in making themselves available and/or in initiating or sustaining contact with their interns (reported in six graduate and four undergraduate interviews), and problems of access created by physical distance and/or security clearance barriers (described in eight graduate and three undergraduate interviews) that made it difficult for meetings to take place.

My mentor is always working in a different place than me and I never get any mentoring whatsoever from him.

He's never done any goal setting—or any of the things that he's supposed to do to help you as a student. He hasn't done any of it.

In the survey write-in comments, there was a small number (n=18) of interns who experienced problems in gaining access to or of getting good guidance from their mentors. Nonetheless, they often expressed an understanding of “how busy” their mentors were. Some of this group also reported that not having sufficient time with their mentor did not, in and of itself, result in a poor internship experience, as the following statements indicate:

My mentor has been very busy this summer. I am not complaining, because what he is doing is important. It is just that I am left to do a lot of things on my own. (1999)

I understand that my mentor is very busy. However, I feel that my time with him was extremely limited. I don't feel that he gave me much insight into what steps I should be taking next. (1999)

My mentor was fantastic—understanding, intelligent, and easy to be around. Unfortunately, he also had a lot of other things that came up during the summer, which he had to attend to; this limited somewhat the amount of time we could spend with each other. (1999)

My mentor/supervisor was a wonderful, bright, approachable individual. His ideas for topics, and his insight in the field, have been invaluable. The most problematic aspect of the summer was his absences. (1999)

A factor that influenced satisfaction with the internship experience was the amount of guidance or leadership provided by the mentor. Both in the interview and write-in data, those interns who expressed most dissatisfaction with their mentors had received little or no guidance from them about what work they should do (and why), and who were left to work out for themselves what to do to keep occupied:

I think an important part of this whole experience is that you need to sit down with your mentor at the very first and discuss some of the things that they expect you to do. And the mentor needs to tell the intern, ‘This is what I hope you'll get out of this. And I expect you to give me weekly reports, and a talk at the end.’ And the intern needs to say what they are interested in—just getting everything out on the table at the beginning—which is something I didn't have when I got here. (Interviewee)

My mentor never had work for me and she was rarely there. It was up to me to entertain myself. I had nothing to do. I asked several times, but it didn't seem to help. (1999)

Our mentor was quite young and immature. He is very knowledgeable in his field, but he did not prove to be a good mentor. Most of the time we had nothing to do, and when he was available, he did not bother to train us. (1999)

A much less common, difficulty (n=6) noted by interns referenced their mentor's apparent lack of preparation for their role in supervising interns:

Dr. [X] would have been an excellent mentor if he had had time. A big problem that I had, and that I saw with a lot of the first-time summer students, was that the labs were not ready for them when they arrived, and we spent the majority of the summer sitting around. (1999)

The mentor I was originally assigned to did not have any use for me. This made my job expectations hard to define. I basically did odd jobs all summer for those who needed me. (1999)

The problems of poor access and guidance from mentors were often overcome by interns turning to other staff and coworkers to get the information or help that they needed. A few of the neutral codes (i.e., non-evaluative) codes assigned to interns' written comments reference their strategies for coping with lack of access or guidance:

It is difficult to work with a mentor who is very rarely around, so I ended up 'adopting' another staff member, who was more effective and available. (1999)

My mentor was absent for a good portion of the summer, making mentoring almost non-existent. However, other staff members did offer me quite a bit of (much-appreciated) helpful mentoring. (1999)

In 12 of the interviews (3 graduate and 9 undergraduate) interns also described a relationship with someone in addition to, or instead of, their official mentor:

You need hands-on people that are willing to explain why things happen, and why not... 'cause you don't learn anything otherwise... And the staff member will tell me, 'Go and do it.' But the technicians say, 'Do you know why you are doing this?' And I'm like, 'No,' because I don't know. So they actually explain and it gives me an idea of what's going on.

Proportionately more of the interns in science and technical positions (i.e., 16 out of 35 interviews; 45.7%) than interns in office/administrative positions (i.e., 2 out of 12 interviews; 16.7%) described problems with access to, or communication with, their mentors. This was the only sub-set pattern to emerge.

Finally, in three interviews (two graduate and one undergraduate) interns were unhappy either that their mentor took no part in developing their Education Work Plan, and/or did not co-ordinate with their university advisor.

The Mentors' Informal Role: Interns' Assessments of the Quality of their Working Relationship with their Mentors and its Impact on their Internship Experiences

In most interviews (44 of 47), interns offered positive comment about their relationship with their mentor, and 35 interviews included only positive assessments. Most observations (by 39 individuals with 11 agreements) were general statements about having a good relationship with their mentors. Interns also explained what they appreciated about their mentors and what contributed to a good relationship. The most commonly mentioned of these was feeling that their mentors took a personal interest in them, and helped to build their confidence:

The first thing that I liked about my mentor was that she took the time to sit me down and say, 'So, tell me about yourself.' That makes a big difference—especially if you're a young student...It could easily be 'I want you to get used to this, study this, and do that—and I want to see that on my desk.' And, that's cool: I can do that too...But when it's like, 'What are you doing? What are your goals?' That's cool. She took the time to understand me as a person—not just what I output.

He never let me down when I had an emergency—when there were people coming and I really needed to get it working. But he also knew the right time to say, 'Hey, you can do this yourself. You don't need me.'

In four interviews, graduate interns observed that mentors, as a group, care about the interns' experience at LANL. This was also mentioned in 14 undergraduate interviews. That mentors had exceeded their expectations of what a mentor would do for interns was reported in 12 interviews.

All other descriptions of the attributes of good mentor-intern relationships were offered by undergraduates: treating interns collegially—as equals, getting to know the mentor as a person, and giving interns a good measure of freedom in their work were all cited as important by undergraduates (and were unanimously agreed upon in several undergraduate groups). Discussion of the interns' career ideas, help with career planning, and with publication of work (in one case) were mentioned also. However, to undergraduates, any behavior that suggests that the mentor cares about them is noted and valued. Indeed, in 18 undergraduate interviews, interns also spoke of how much they "relied" on their mentors for support. The suggestion that it is not a good idea to be "too dependant" on one's mentor was offered in seven interviews (in three graduate and two undergraduate interviews) as advice to oncoming interns.

The interview data also included observations on the types of working relationships that interns valued in their mentors, and the interest that they took in their

protegees' educational progress and career development. Several interns had been drawn into the mentor's research team; others had the informal support of a group of staff.

Some interns also mentioned working for several mentors simultaneously as well as working "one-on-one" with a mentor, and of situations where co-workers were so helpful, they felt no need for their mentor:

Dr. [X] is a wonderful supervisor. His mentor capabilities have been primarily encouragement and personal knowledge of the field...and graduate school. Dr. [Y] and Dr. [Z] have both acted as additional mentors to me.

I think it's nice having a mentor right there by your side because they are easy to contact in case you need anything, such as help or advice.

He takes the time to know his students personally.

Worked very closely with mentor. Was able to learn much more than I expected.

I had a clear idea of what I wanted to do here, so I didn't take advantage of a mentor as much as a more junior student might have. The staff I worked with provided excellent informal mentoring.

In a small number of interviews, interns described problems with their relationships with mentors (9 of 47). Relationships that were "generally bad" were described in three graduate interviews. More specifically, interns described situations where the mentor did not make enough time for them, where they avoided a mentor with whom they did not get along, and where the age difference between the two inhibited the relationship:

I made it clear to my division that I would like to utilize her as my mentor, if that was possible, because I don't have that kind of mentoring in this group. There doesn't seem to be—I don't want to say the care or the interest—but that's what it feels like...If I say they're not interested, that sounds real strong, but it kind of leaves you with that feeling.

But I don't feel that he's really done a lot. And when I e-mail him, he doesn't really answer my questions...I don't think he's too concerned about my goals...or what I came into this with.

More seriously, one graduate intern was afraid of her mentor; in two undergraduate interviews, the interns felt that their mentor exploited them for their labor; and one undergraduate of color reported that her mentor made racist and sexist remarks:

I had a hard time with my internship when I first started, 'cause the guy that was mentoring me left. And then the guy that took over the mentorship, we didn't get along. And eventually, I had to report him to [X] because he was really mean.

He would make racist remarks and say sexist stuff...So, it was really, really hard. I've been here about a year and a half, and it's only recently I've really been getting mentoring.

The only suggestion of a pattern in these negative comments is that they were all contributed in interviews with students of color (i.e., from three out of eight interviews with Asians, two out of six interviews with African-Americans, one out of four interviews with Native Americans, and three out of 15 interviews with Hispanics). They were raised in none of the interviews with white interns.

Interns' Advice on Mentoring

In their survey comments, 11 interns offered advice about improving, either the matching system by which interns are placed in particular positions with particular mentors, and/or the need for training for mentors:

A regular, perhaps weekly, meeting time with my mentor would have been helpful. More interaction would have provided even more food for thought for my project. (1999)

Perhaps have it so that each student has a different supervisor and mentor, so as not to take up too much time of any one person alone. (1999)

If the laboratory were to help the students find a job here at the labs that were related to one's major in college that would make things a whole lot easier. It seems like the lab just takes in our applications and just leaves us alone. (1999)

My mentor was great, but from what I have heard, many aren't. There should be required training classes that mentors have to take if they are going to have students. (1999)

[My mentor] was good at times, but she herself could use a lot of work on her skills. (1999)

Despite intern reports of various difficulties with gaining access to or of unhelpful behavior from their mentors, the information from all three data source supports the conclusion that at least three-quarters of interns responding to the 1999 survey question on the quality of the working relationship with their mentor were very satisfied with the contribution made by their mentors—both in terms of access and in the quality of their relationship—to the success of their internships.

Interns' Survey Comments on Student Advising

In both the 1998 and 1999 surveys, Question 14 asks interns to "Rate your interaction/availability of your division's Student Advisor(s)," and Question 14B asks for "Comments on Student Advisor(s)." In 1998, interns offered 135 observations on 34

different issues related to student advising; in 1999, they offered 107 observations on 30 issues. Looking at only those observations that were evaluative in nature, the balance of positive to negative evaluations was very even across both years. Taken together, there were 91 positive observations referencing 12 issues, and 101 negative observations, also referencing 12 issues. While the positive observations are constant across both years (47 in 1998 and 44 in 1999), the number of negative evaluations drops from 65 in 1998 to 30 in 1999. The remaining balance of comments offered advice, neutral observations, or mixed evaluations in similar proportions for each year. The range of issues solicited by the question was, thus, very wide. Almost half of the codes assigned to interns' comments were used only once (1998: 14 of 30 codes, 1999: 14 of 34 codes).

The most common single response of the interns to Question 14B was to express lack of awareness that such a person or system existed (1998: n=32, 1999: n=20). This response represents 51.5 percent of all negative responses to the question. This group of interns wrote:

I have a student advisor? (1998)

WHO/WHAT is a student advisor????? Is that my boss? (1999)

Student advisor? (1998)

I do not know who my student advisor is. (1999)

WHO? (1998)

I didn't know we had a student advisor. He/she never got in touch with me, at least not to my knowledge. (1999)

My division has a student advisor? (1998)

I have absolutely no idea who this person was, so obviously he or she was not useful. (1999)

Four interns asserted that they had not been assigned a student advisor:

Don't have one. (1999)

We did not have a student advisor. (1999)

Due to the fact that our division is so small, we did not have a student advisor. (1999)

[My division] does not have an assigned student advisor. (1998)

Being uncertain about who their student advisor was or what their role might be, a number of these interns responded to this question by writing about their mentor, and some interpreted the question as referencing their mentor:

I didn't realize that I had a separate advisor. If this is not the case, perhaps my mentor fills that role, then I had a good experience. If there is an official Student Advisor, then I am unfamiliar with them and refrain from comment. (1998)

I don't understand this question. I answered the mentor question earlier. (1999)

If this is the same as my mentor/boss, then I would say that he was a very good mentor/boss. (1998)

[X] pretty much filled this role, although I don't know if I have an official student advisor. (1999)

The only advisor type person was my mentor, other than that, I saw or spoke to no other advisor. (1999)

If it's my mentor, excellent. (1999)

I did not know who my student advisor was—no contact with him/her. My mentor was great though! (1998)

Ignorance about the student advising system was the strongest single finding arising from this question. However, 37 percent (71 out of 192) of the comments from those interns who were aware of, and had interacted with, their advisors were positive (1998: n=39, 1999: n=32). They described their student advisors as available and helpful in a number of ways—largely as sources of information and personal support:

They were readily available, and willing to help at all times. (1998)

I have gained a wealth of knowledge from my student advisor. She majored in the same areas as I will, and she had a lot of information to feed me. She was also very helpful when I had questions dealing with laboratory policies. (1999)

They were there for me whenever I needed help. (1998)

She is always available and attentive to concerns. Her student event ideas were fun, exciting, and educational. She is always wanting feedback from students, and greatly values our opinions. (1999)

Student advisors have really been a big help to me when I've had questions. Thank you. (1998)

I think that [he] really looks out for the students within [X]. He is interested in our education and is interested in our futures...He really made it a positive experience. (1998)

I was always well-informed on how to teach our student advisors they are very active and helpful. (1998)

[She] is really easy to talk to and makes herself available to talk to students even on her busiest day. You get the feeling that she really cares about students and wants to see them succeed, and she also makes working at [X] a fun experience. (1999)

Offered support and encouragement that was extremely useful to the informational needs of me and another student. (1998)

[She] was very helpful in answering any questions that came up. She was also concerned about our thoughts and feelings, and was someone we knew we could turn to with any problems. (1999)

My student advisor...was invaluable to my experience. He was open, friendly, and helpful. He has given me great assistance in helping plan my career goals and for the future. Kudos to him; he did a wonderful job. (1998)

Some of these interns reported regular meetings with their student advisors, and/or keeping in touch by e-mail:

Our student advisor held a bi-weekly meeting with all the students to get an update of our projects and to discuss issues that were relevant to the students. I found this activity to be very useful and a great improvement on past summers. (1999)

She was available if I needed help. We also had bi-weekly student meetings, which she ran and which were very helpful. (1999)

She sent out a couple of e-mails reminding us that she was there if we needed her. (1998)

The balance of all negative evaluations (n=49; 48.5%) was offered by interns who knew who their student advisors were. Of these, 23 interns (12 in 1998 and 11 in 1999) wrote about the limited nature and poor quality of their interactions. Some of this group did not meet their student advisor until late into the internship:

We had one meeting with the student advisors at the beginning of the summer and that was the last time I saw or heard from them. (1998)

The poster session went well, however, there was no other contact with or between the students and the student advisor. (1998)

He only dropped by the lab to ask me to fill out this survey. (1999)

Not helpful at all. Very rude and condescending. (1998)

I only e-mailed her ONCE. I really needed some advice on what I should do to get reassigned for Winter break because I want to come back and work for six weeks. I never got a reply. (1998)

Our student advisor wasn't very helpful at all. I never received any information regarding meetings or other required student events. I was only told afterward. (1998)

Sometimes curt with the students, and a little too limiting with her assumptions of the students' knowledge base. (1999)

I didn't know who my student advisor was until two months into the summer. (1998)

I did not know about the advisor program until after I had been here many months. Even when I was at UGS, I had never heard of them. (1999)

I didn't really know they existed until a few weeks ago. (1998)

Nineteen interns noted that, while they were aware that student advisors existed, they had never met their own advisor:

I never met mine. (1999)

Never met student advisor. (1998)

I don't think my student advisor ever did anything. I don't know their name, never ran into him or her at student functions, and I never got e-mail from him or her. (1999)

I did not know who my student advisor was—no contact with him/her. (1998)

I never interacted with my student advisor. (1998)

Did not have contact with him/her. (1999)

A comment offered by an intern who had worked as a student advisor illuminates one reason why the student advising system appears to be so under-used: interns' lack of

awareness may be matched by low motivation by some student advisors to contact their interns and offer them help:

I was a student advisor (peer mentor) and I am happy to report that I didn't have to talk to anyone this summer. Of course, that could be because people forgot about the position, or they didn't want to come forward with their problems. (1999)

A second reason for low system use was mentioned by a small number (n=23) of interns who wrote that they did not contact their advisor because they felt no need for their help (1998: n=10, 1999: n=13).¹³ Mentors and co-workers were seen as able to supply the assistance and information that these interns needed:

I never had the need to contact my student advisor. (1999)

My mentor was able to handle all of my questions/needs. I did not try to contact the student advisor. (1999)

I don't even know who it is, but I don't have the need to know! (1998)

I didn't find a need to go to a student advisor. (1998)

I never had any specific reason to talk to my division advisor. My group secretary was great at answering administrative questions and the like. (1998)

My student advisor is behind the fence. That discouraged me from trying to contact her. But, as a Los Alamos native, I didn't have any real problems. (1999)

I have no idea who that person is, but I never needed them for anything either. (1998)

Division student advisor? Didn't know I had one. Don't feel like I've been missing anything. Don't think I need one. (1999)

Interns who offered advice to LANL's student advising program encouraged student advisors to contact the interns to whom they were assigned:

I think that an e-mail would be nice every now and then so we can get familiar with them. (1998)

He could send out a bulletin or something, at least once. (1998)

Someone needs to make sure new student hires are paired up with a mentor and/or student advisor. (1999)

¹³ The evaluations of this group were classified as "neutral" responses.

I think meeting with our student advisor would be good so that we actually know who and where they are if we need help. (1998)

Clearly, if this system is to be useful to those interns who would like to make use of it, the priorities would be: first, to ensure that the system is in place in every department and for every intern; second, to make incoming interns aware of this source of assistance, who their assigned advisor is, and how to reach them. As it seems that not every intern may need the help of a student advisor, and that their needs may be adequately met by mentors or colleagues, interns (and/or their mentors) might, perhaps, be contacted sometime after the start of the internship reminding them of the system and who (and where) their advisor is in case the need arises.

5. Interns' Evaluations of LANL's Institutional Contribution to the Internship Program and to Their Internship Experiences

A. Entering the Internship Program, and the Intern-Job Matching Process

The information in this section comes from both text data sources. Where possible, issues are treated thematically with findings from both the interview and survey comment data presented together. It should be noted that only one survey question (11B, 1998 and 11, 1999) addressed application and appointment issues. Interns were asked to “comment on the on-line application” following a question in which they were asked to rate the on-line application process in comparison to “annually submitting a resume and a written employment application.” The survey did not specifically ask interns to explain how they heard about the internship program, or to evaluate program advertisement, recruitment, the selection and hiring process, or the processes by which applicants are matched with particular work positions. However, interns commented on all except the first of these issues in their write-in comments in answer to Question 11. The interview data offer information about how interns heard about the LANL internship program.

In the survey comments data, there were 237 individual evaluative observations on aspects of the application, hiring, and intern/job matching systems across both years of the survey of which 53.2 percent (n=126) were positive and 46.8 percent (n=111) were negative. The remaining observations offered advice, or were general in nature. The main difference between the two years was that 75 percent of all the evaluative observations were offered in 1998 (i.e., 178 in that year, compared with 59 in 1999). The distribution of positive to negative comments, is, however, broadly the same for both years. Positive evaluations were 52.8 percent (n=94) for 1998 and 54.2 percent (n=59) for 1999. Negative evaluations were 47.2 percent (n=84) for 1998 and 45.8 percent (n=27) for 1999.

Five issues dominate the positive responses—all of which refer to the on-line application system. However, negative responses are split between concerns about on-line application, and concerns about other aspects of the entry and job distribution system, as follows:

- Specific concerns about the application, selection, and job distribution systems (1998: n=30, 1999: n=9)
- Concerns about the efficacy of the on-line application program or its use as a hiring aid (1998: n=29, 1999: n=5)
- Questions as to the efficacy or fairness of LANL's application, selection, and job distribution systems (1998: n=18, 1999: n=8).
- Issues of access to the on-line application (1998: n=7, 1999: n=5).

The number of specific concerns about the on-line application process drops between 1998 and 1999. However, in order to see the patterns on other issues, it is necessary to consider the data (from both sources) on each stage in the interns' entry process.

How Interns Heard About the Internship Program

Only the interview data offered information about how potential interns heard about the Internship Program. Most of the interns (72 of the 83 interviewed) described how they first learned of the program. By frequency of mention, the seven channels of information were:

High School: Seventeen interns first heard about LANL internships through an announcement at high school, or through a high school co-op program.

Family and Other Local contacts: Twelve interns had a family member working at LANL—a parent, spouse, or other relative. Another nine learned about it from someone working at the lab that was not a relative. Four other interns also lived locally, but did not explain how they first heard about LANL internships.

College/University: Nine interns had encountered some form of announcement (i.e. flyer or e-mail) at their institution of higher education, or had heard someone at school talking about it. Three more had been directed to the LANL program through their involvement in a specific school program, and four by a school advisor.

Web Searches: Four interns learned of the LANL internships while searching the web for information about research positions in their field of study or intended career.

Other Internships: Four interns had heard about LANL internships while working on internships elsewhere.

Friends: Three interns had first heard about internship opportunities through friends who had also been interns.

Professional Contacts: Two interns had been made aware of LANL internships through a fellowship, and a third at a professional conference.

What is striking about this breakdown is how greatly the recruitment of (this sample of) interns depended on informal contact and word-of-mouth descriptions of the opportunities available at LANL. This was also noted by interns, and its consequences are discussed in the sections that follow.

Interns' Evaluation of the Internship Entry Processes

The following summary of observations on LANL's entry and job distribution system for the internship program are derived both from interview and survey comment data. Interns' retrospective comments on the formal processes by which they had come to be working as LANL interns in particular work roles are of some interest because they contribute to their overall evaluation of the internship experience. Across the two data sets, seven issues were identified as affecting interns' assessment of the LANL

application, hiring, and job placement processes. They are discussed in the balance of this section.

Advertisement of Internships: As noted above, the majority of interviewees reported that they had learned about the internships through personal (often local) contact. Other interns noticed this also, and, in 20 interviews, interns assessed the internship program as insufficiently publicized. Interns suggested improved communication with schools and universities to increase awareness of LANL internship opportunities among relevant student populations. They also asked that on-line and printed information be more accurate with regard to job descriptions:

I think if they had advertisements with specific positions—more diverse from the ones they have now—I think you would get more motivated people—better people—because they’re the ones that are out looking for the jobs.

Recruitment: In 12 interviews (10 undergraduate and two graduate) interns discussed the need to reach out more effectively to under-represented populations in the sciences:

I think they’re interested in diversity, but they are missing a lot of people because they’re not looking in the right places. They’re only looking for people who are in the same institutions that they came from—or the same lab systems. They’re looking for people like themselves.

Interns of color who had themselves been recruited reported how little the members of their own minority groups knew about the opportunities offered at LANL.

Application Process: In the interview discussions, interns commented on the slowness of the application process: plenty of lead-time was required when making an application to LANL because LANL’s admissions’ office response time was very slow. The process could take even longer where it involved separate application to a school program as well as to the internship program. Interviewee’s assessments of the on-line application process are discussed below along with those from the survey comment data.

The On-line Application Process: For both years of the survey, the code most frequently assigned to interns’ written comments denoted approval of the on-line application system; interns said that the process was easy and convenient and helped to streamline the bureaucratic hiring process (1998: n=57; 1999: n=26):

Much easier and more convenient. (1998)

Anything that speeds up the process is good. (1998)

Saves a lot of time and stress by enabling students to apply on-line. (1998)

The on-line application is quite easy to use and far faster than taking the time to fill out paperwork. (1998)

I like it. It's very convenient. (1999)

The on-line application was very easy to understand. I don't think it really needs to be changed. (1999)

It works pretty well. Pretty straight forward and easy to use. (1999)

It sure saved a lot of time and spared us the confusion of, 'Who do we send it to?' and 'What do we need to send?' and 'What are the deadlines?' etc. (1998)

Saves a lot more time than having to type up stuff and then fax it to a right number. Now, when one fills it out, one will know it will get to the right place the first time. (1998)

It is much more accessible and I didn't have to hassle with getting copies to different people. (1998)

This view was supported in 10 interviews where the on-line application system was discussed. Interns who had experience with the traditional application system reported that electronic application was easier, faster, and more convenient than application by paper methods.

In addition to praise for the ease-of-use of LANL's on-line application form, some interns also offered general support for the use of computers as an application method. Self-identified "computer literate" interns regarded computers as the perfect intercessory (1998: n= 20, 1999: n=2):

More students have access to computers now, so that is a much more efficient way to transport information. (1998)

Being digital myself, the on-line application is the perfect method of creating and updating my resume and professional information. (1998)

It was quick and easy being that I am constantly using the computers at school, it didn't take away time to have to write out a resume and then later type it and submit it. It was all done electronically! (1998)

It makes everything easier, especially since computers are very accessible. (1998)

Interns who had applied for a position at LANL from a distance also appreciated the on-line application because it eased their concerns about the possibility of problems with the US postal system (1998: n=13, 1999: n=4):

The on-line application was very helpful because of the distance between myself and the lab. (1998)

It's very easy to use and eliminates the fear of losing important papers in the mail. (1998)

It was a lot easier than wondering if the application I mailed ever got there. (1998)

I think it's wonderful that this is available. It's amazingly helpful for out-of-state students. (1999)

Interns' negative comments about the on-line application system included those from returning, year-round, international, and high school interns who were frustrated by having to complete another full application for each return, rather than a shorter form that would reference their original application and bring it up to date. They described the design of the application form as redundant and creating unnecessary work, and some of the questions as inapplicable:

If you already know you are returning to where you previously worked, why fill out an application? (1998)

I think it should ask you if you already have a job set up with someone. If so, there's no need to list all of your skills, etc., as if you were selling yourself. Just ask the bare minimum of questions. (1998)

I HATE having to update it every year!!!! Why do we have to???? Anyway, I think we should only have to update it when significant changes in our lives have taken place. Not much happens in a year.... (1999)

It's certainly better than having to mail one in, but there is a tendency for returning students to be more likely to put it off. (1999)

Interns also pointed to administrative problems with the use of the on-line system. The problem of delays in responding to applications mentioned also in the interviews—a problem that was compounded when mail related to the application was sent to the wrong address—was not necessarily resolved by the introduction of the on-line system:

This system is, according to my boss and other managers, very slow and difficult to use. It must be improved to be useable. (1998)

My acceptance letter and hiring forms were sent to me after the final date I designated for being at that address. This created some confusion and delays on my start date. (1999)

Nor did the use of the electronic system prevent errors, or prove faster in correcting them:

It took really long to get my pay-stub correct. I filled out the new on-line application and I was supposed to get about \$8.00 an hour, but it took about three weeks for the change to go about. (1998)

[I didn't know about the on-line application]...I lost an extra two dollars per hour for two weeks until all of the paperwork was put in order. My home address was known, but was not used. (1998)

Some on-line applications had also been "lost":¹

I applied in early November and got 'lost' electronically. (1998)

I liked the on-line application but I had to do it twice because my first application was lost. (1998)

In the past years I have had problems submitting my on-line application. I would submit it, however, it would never reach the database. I had to submit it several times before it was received. (1999)

Interns also disliked having to submit additional resumes to individual departments:

It facilitates applying, but I found that applying was only secondary to individual resumes that I was asked to submit to the specific departments of interest. It would have been nice if I could have submitted just one transcript and resume. (1998)

Since I had to submit both [an on-line application and a paper resume] it ended up being twice as much work. (1998)

As already reported, some interviewees with prior LANL experience found the on-line process faster and easier to use. However, the text data reveal a division of opinion among the interns about this. Some survey comment writers described the process as "tedious," and were frustrated by problems with the program. Among these, they listed insufficient directions, lack of editing or format options, and described the application structure as restrictive and limiting. Along with some of the interviewees, they also assessed the on-line application form as lengthier than necessary:

Extremely long and tedious. (1998)

It was kind of time consuming for the student, because we had to cut and paste from our original resume. (1998)

It was a pain to fill out on the computer when I already have a written resume. I didn't like the fact that I had to re-write it. (1998)

¹ The problem of on-line applications being 'lost' may arise from glitches in the on-line program, rather than from administrative errors *per se*.

I hated the on-line application...The on-line application is extremely time-consuming and obnoxious. (1999)

Some areas were quite confusing and lacked proper instruction. (1999)

The one thing I would suggest is maybe reevaluating the clarity of the application questions. Several times I wasn't exactly sure what the application was asking for. (1999)

I did not like the on-line application because I could not control the format of the information in my resume. (1998)

It doesn't allow for as much originality. Everybody fills out the same form. (1998)

It is a nice way to do it, but I think the interface could use a little bit of work. It seemed a little blah...You could not customize it very well. Seems like everybody's application would just look the same.... (1998)

It [the on-line application] does limit in some ways a person's ability to express their qualifications. (1998)

I have seen formatting differences between the version we fill out and when I look at the end product from the lab. Corrections seem ineffective. (1998)

The interface is beyond awful. It's slow, it crashes, there is no random access to different parts. Information disappears, very difficult to review everything at a glance. KILL IT. (1998)

Several interns also raised issues of computer access—(for some potential interns) both access to a computer, and problems of getting access to the on-line application program. Some interns had been unaware that the on-line system existed; others did not know about the submission deadline (1998: n=8; 1999: n=4).²

It's great when you have a computer, but makes life pretty rough if you don't. (1998)

As a casual student without a lab e-mail address, I did not find out about the online application.... (1998)

I had trouble accessing it from [high] school. (1998)

I was unable to access the on-line application from my computer. My mom had to pull it up through the lab and update it. (1999)

² Numbers given here represent codes for these issues taken together.

I had troubles accessing your web page and completing my application from my [high] school's computer. (1998)

I forgot my log-in number so it was hell updating it. (1999)

The only problem I have with it is I already forgot my password. (1998)

Should be easier to get in and make changes because it is hard to remember the password when you only need to enter it once a year. (1999)

I had to fill out all the paperwork by hand. Where IS this on-line application? That would have been a lot easier! (1998)

I wasn't aware of the on-line application process until the last minute. I think there was a misunderstanding or miscommunication, but nevertheless, it wasn't made clear to me that the on-line application even existed. (1999)

This [the on-line application] was not made aware to me until I arrived here. Thankfully, my mentor helped me to take care of this. (1998)

Not a bad idea, but if a returning student did not know that it was necessary to complete before returning to work, it was very easy to not do. (1998)

Interns offered advice about how to improve the on-line application (1998: n=20, 1999: n=13). Their suggestions included changes in the program, and offering interns a choice in how they apply (i.e., paper or electronic):

The on-line application seems rather lengthy. Maybe think about cutting it down in size a bit. (1999)

It [the on-line application] was somewhat constricting. There should be a place for keywords to identify yourself. (1998)

It would be nice to see the resume printed in a nice form. I'd also be interested in being able to print the information in a format that is presentable to others. (1998)

Make a printable resume in a readable format for the mentors. (1999)

The option of editing your on-line application needs some work. It stated that the option was available, but it never worked. (1998)

There were a few problems I encountered...when I would go to a previous page there would be problems...with capitalization and spacing. Perhaps the problem was taken care of? (1999)

Modifying information was painful. Just make it so you can change individual items without paging through eternity. (1999)

This application should be more navigable. I think that currently, one can only go straight through the application page by page, which is time consuming and useless if only one page needs to be updated. (1999)

Have the employment history section in reverse order so that you may add your most recent positions without having to erase ALL of the previous entries and paste them into later pages. (1999)

I think the application would be improved if the applicant was able to view the entire application, instead of one question at a time. (1999)

What would be the fastest way to get an application in? Would it be easier through the web page provided? (1998)

Spell-checker and a chance to save your application.... (1998)

Interns also offered advice to applications system administrators about how to use the on-line system to better effect:

Maybe you could send us an e-mail response on actually receiving the application; it would be helpful. (1998)

An e-mail or written letter would be nice to receive so that we know our application has been received. It could have been lost due to mechanical error. (1998)

You'd better send passwords out by paper mail to every student. (1998)

I would like to see some changes in how transcripts are handled to make it easier for everyone. (1998)

Keep the application there for a little longer than a year so that we can just make changes....My application was gone out of the system and I had to do it all over. (1999)

Does it include past applications in your database? Kind of hard to keep track of all that stuff you ask for. (1998)

Several interns preferred the traditional method of applying for a job, or wanted to have a choice of application methods:

It was annoying to re-type all that I have previously done (with respect to the resume, etc...) I feel like an option should be given, either submit by web or in writing. (1999)

I would rather submit my resume. (1998)

I liked submitting a resume and transcript on a yearly basis...this is way too clumsy of a system. (1998)

ALL STUDENTS SHOULD BE REQUIRED TO SEND A RESUME! It's a requirement for employment after graduation, and a key tool for the employer to get to know the student's experience level. (1998)

[The] old way was better. (1998)

International Applicants: All seven of the international interns interviewed, and two of the (self-identified) international students who offered written comments, were critical of the application process. The following extracts from the interviews indicate that these interns had found the application process more tedious and time consuming to complete than had their US peers with whom they compared notes:

I would definitely try to improve the paperwork for foreign people. I had a problem because the application was going too slowly through the lab. And I kept saying, 'Look, I need to be sure that I'm coming to apply for a visa and get my plane ticket. The longer I wait, the more expensive it's going to be.'...The American Embassy wants you to give them the paperwork at least three weeks in advance, otherwise you have to pay them a fee. Well, the lab took so long, I ended up paying that fee. I was supposed to start here at the beginning of April, but I actually started at the beginning of May. Believe me, it wasn't a nice month—just a struggle to get the papers out of them.

When I applied for this position, it was difficult for foreign nationals—especially in the facility I wanted to work in. It took two years for that to happen, and, of course, my time at the university was passing. So, now I have to finish by the end of spring semester next year, which is when my international support from the lab will finish also.

They also found cultural biases in the application form that made them hard to respond to appropriately:

It is confusing and much of it is inapplicable/undecipherable to out-of-the-ordinary cases such as nationals from foreign countries. (1999)

In general, unnecessarily cumbersome. As far as I remember, there was no way to enter a non-US degree that didn't fall into the categories of BS/BA MS/MA, etc. There should be an 'other' category with a blank to fill in. (1999)

Some international interns had experienced lack of co-ordination between departments involved in processing their applications:

I would think there should be some links between the two departments—the one that processes all of the paperwork for the lab, and the one that does all of the work on the visa—just to be sure that one department isn't saying, 'Yes' while the other is saying that there's a problem three weeks later.

In the interview discussions, international interns were concerned that the greater volume of bureaucratic effort required of LANL to recruit and place international interns (particularly since the recent security problems) was having a negative effect on the hiring chances of international applicants now, and in the future:

The problem is that I'm foreign, so I couldn't apply to this or that section because of security concerns. Chemistry could be applied in the nuclear field, but then there's security, so I wouldn't be allowed, so I had to really try to find the right section.

When I applied for the first time, it took like six months to process. But then it all changed. They simply stopped hiring foreign nationals in the field in which I was trying to do my work.

These concerns were also voiced by US interns who had been witness to some of the problems:

The issue I have heard come up between both laboratories is that they have more difficulty hiring foreign national students. My guess is that they are probably scrutinized more now because the whole issue of security is at the forefront.

We have a lot of foreign nationals in our group, and they are taking a beating right now. We have a lot that are trying to come over—we just got two new students from Mexico. I can understand it to a certain extent, but I think it should go as far as the security and end there.

We found out right before the interview that he wasn't supposed to be on site. Our group leader found out that he wasn't a US citizen. He said, 'Well, you can interview him, but we're not hiring him,'—because he didn't want to go through the paperwork...I looked at his resume and talked to him a bit before they forced him off site. He sounded like he had some really good skills that we could have used. But somebody ran and got a government vehicle and took him immediately off-site. I thought that was really rude, and he was extremely embarrassed. I also thought my group leader was really stupid not to hire someone good just because he didn't want to do the paperwork.

The Hiring Process: Most interview observations on the processes by which interns were chosen for the internship were critical. In 16 interviews, interns discussed the high

degree of competition for internships, especially within certain divisions. The screening process was argued to rely too heavily on academic record within particular majors, or particular degrees, without taking research background, work, or other relevant experience, into consideration:

They don't distinguish between someone coming straight out of college and going straight on to a Master's and someone who has been out of college for five years and has that work experience to bring in.

Some interns thought there were "degree barriers" that restricted access to certain jobs:

I heard that, if you want to be a staff member here, you have to have a Ph.D. I don't know how true that is, but I heard a lot of that.

I don't think that you can get a job here straight out of school. At least, in the lab, you have to have a doctorate to do actual research.

And maybe they hope you'll come back as a post-doc, because I don't think they really talk about a career in that division until you have been a post-doc with them.

The process of reviewing resumes was thought to over-rely on key words in order to place applicants into categories without the reviewer reading the entire resume. Not knowing the "right" key words was argued to prevent a qualified applicant from being hired:

Depending on what you write, they could throw you totally out of what you're actually interested in—if you don't know the right key words.

That these concerns about the program's hiring process were expressed in 12 (of 16) focus groups with all-female interns is notable.

Questions were also raised in written responses to both the 1998 and 1999 surveys about the efficacy and fairness of LANL's hiring process. Interns wondered whether the "right" people ever saw their applications:

I am not sure whether the hiring people go through all the applications (irrespective of whether they're on-line or a written application). (1998)

It [the on-line application] was okay. Do the right people really see these? (1998)

They suspected that some supervisors did not know about, or did not make use of, the on-line application database in searching for appropriate applicants:

Many supervisors looking to hire students are unaware of the on-line student application list. (1998)

Many staff are unaware that the on-line application service exists. It would be helpful if the staff knew they had other resources when looking for potential employees. (1999)

[The on-line application is] a great idea. Makes updating things much easier. All we need is for the employers to look at it. (1998)

Comments on the Orientation Package: Survey Question 9A asks interns: “If you were a NEW hire for the summer of 1998/1999 and attended the New Student Orientation, was the orientation packet you received useful?” A large number of interns chose not to answer this survey question, the response rate being approximately 40-43 percent for both survey years. In their written comments, interns added only 81 individual points in answer to this question in 1998 and 55 in 1999, making the frequency of comments on this question respectively the lowest and second-lowest in the survey comments data set. Other limitations on the information are that, for each year of the survey, about half of the issues raised were mentioned only once, and most of these were negative (1998: five of six negative issues raised; 1999: six of 10 negative issues raised.)

Given these limitations, 1998 yielded 49 evaluative comments, of which 80 percent (n=39) were positive, and 20 percent (n=10) were negative; 1999 yielded 34 evaluative comments, of which 59 percent (n=20) were positive and 41 percent were negative (n=14). For both years of the survey, the positive comments indicated that the orientation packet was helpful as a source of information and served as a good introduction to LANL:

There was helpful information in this area for people that were not from here. (1999)

I felt that the orientation was useful because the packet that was given mentioned a lot of information on what is expected at the laboratory and what procedures needed to be done. (1999)

The orientation packet has all the information we need to know as a student. (1998)

There was a lot of information that made understanding the lab procedures, etc., a lot easier. (1998)

Lots of great information. List of phone numbers and services was very helpful.

The maps were helpful and so was the sheet of phone numbers.

Interns’ criticisms of the orientation packet focused on information overload, and details that were hard to understand (for example on insurance coverage and other benefits):

Try to make it as concise as possible. Getting hit with too much information all at once is overbearing. (1999)

Mostly useful, but also long and convoluted. (1999)

Insurance stuff was very confusing for people who don't really know much about health insurance anyway. It would be helpful if that was explained better. (1998)

Clarify benefits and insurance a bit more. (1999)

Two individuals in both years of the survey reported that they had never received an orientation packet, or were unaware of its existence.

Interns' advice for improving the orientation packet centered on wanting more information about LANL itself (and about its geographic setting and local amenities), and about how to navigate the LANL system as an employee:

More information about the organization of the laboratory would have been helpful. (1999)

I would actually have appreciated more information. There were still things that weren't explained, and the bureaucracy can be rather hard to figure out. (1998)

There's a lot of information, but perhaps more history on LANL would be appropriate. (1999)

I think that out-of-state students need to be aware of the location of Los Alamos, and its distance from larger cities, such as Albuquerque and Santa Fe. (1999)

It would be helpful to have information about surrounding towns/cities/sites, and also some maps or instructions on some of the hiking/biking trails and hot springs. (1998)

Matching Interns with Appropriate Work Positions: Interviewees were concerned that they could not discern any consistently applied rationale for placing interns within particular departments or divisions. Speakers in 14 focus group discussions (nine with undergraduates and five with graduates) argued from observation of negative consequences that the resume screening process should be done with greater care in order to ensure that individuals and positions were more appropriately matched. While it was acknowledged that placement was formally based on academic record, interns saw inconsistencies in job matches such that some interns were not qualified for the work they were asked to do:

If the student that I am working with would have been left alone to do this project, she would be lost—completely. And I think, if they are going to give a job to somebody, they should have the qualifications.

Some were inappropriately placed; some were in situations where their skills and knowledge were not drawn upon; some had insufficient work to do:

I would change how students are brought in—bring them in on the experience they've had, the work they've done, and the education they've had, and then figure out where they should be placed, rather than just starting them off at the bottom. I don't think that makes any sense at all.

This last observation is interesting because, based on this statement, the speaker clearly thought that the official policy was to “start everyone off at the bottom,” as opposed to trying to match interns to work by qualifications, experience, and interest. One result of the perceived failure to look at applications as a whole was the placement of interns in positions for which interns and co-workers subsequently assessed them to be under-qualified. (These points were also made and illustrated in the two prior chapters on career relevance and on work and learning.)

Some interns saw the application process as “one-sided,” in that applicants had no real control over where they were placed, and whether the positions they were offered were appropriate to the resumes and work requests they had submitted:

I think they should hire more based on merit and interests...Maybe they should assess what a person's interests are before they hire them.

I wasn't really matched with anybody. I mean, that might be a good idea. But I'm not sure that they look at everyone's applications, and I think it's kinda selective. I just hope, at least, they look at everyone's application.

I know from talking to other students that the resume matching system doesn't work very well...Mentors can go out and try to find students, but students can't go out and try to find jobs. I wasn't able to go out and search for a job that I would like—they had to come and find me.

Mis-matches can create special difficulties for international interns:

He just wasn't meeting the expectations of the supervisor who was used to post-docs, not grad students. So he thought this guy should be able to work totally independent of him, without asking questions. But grad students aren't like that; they have questions. He wasn't a bad student: it was just a bad match. And he was gone in two weeks. And he was a foreign national, so he couldn't go home and think about it for two weeks. If he didn't have a job, he would lose his visa, and he was in a panic about what to do....It was not a good situation for him, and student programs were not supportive whatsoever.

It may be important to note that nine of the groups where complaints about the job-matching process were made were composed entirely of female undergraduate interns and eight were composed of interns in office/administrative positions. Ten of the 14

focus groups were composed of first-time interns. In the other four groups, interns with prior LANL experience stressed the importance of being assertive and persistent in the application and matching processes.

The interviewers also encountered a strong belief among interns (in 12 undergraduate and five graduate interviews) that it is important, even necessary, to know somebody at LANL in order to be hired. Interns who offered this perception used it as a partial explanation of why they had observed interns in work roles for which they were ill-qualified, or had nothing much to do:

I would try to spread out the jobs in the different fields, take all of the applicants, and hire the best qualified. Because—like he was just saying—a lot of the people that are more qualified don't get in just because they don't know somebody.

Speaker #1: You get this real structured resume, and it's kinda hard because they've never hired anyone that way from my lab. They've never hired anyone using the system.

Speaker #2: Well, I had that problem too, because there's an undergraduate working in our group, and she's not very experienced. And, according to the specifications on my application, he gave me a different job than what I was hired for. He gave the job to her. She didn't have any experience, and now I'm working on most of her projects because she doesn't know what she's doing.

As far as how they place students, I think, if you don't have a connection....'Cause I think it needs to be based on merit. I mean, you may know someone, but what if they can't get the job done? Just because you are making their uncle happy by hiring them doesn't mean that the lab's benefiting. I think this needs to be taken into consideration.

By what they had observed and heard, some interns had reached the conclusion that this is the way people normally get jobs at LANL. Some credited their own hiring to someone already at LANL who had helped them to get their current job:

For me, it was very easy because I was accepted before even filling in the forms, because they told me, 'We want you here.' And yet, it took, like two months of bureaucracy—which I never understood why....I never interacted with anyone in the process, other than my mentors, of course, who were related to the internship program. It was actually very simple for me because I never had to start anything. My mentors did everything for me.

For me, it was easy because just like—I had connections. So they were like, 'Well, you're hired, but, as a formality, you have to fill out these forms and send your resume and cover letter.'

My boyfriend had to really fight hard to get in—applying and writing letters and really begging to get in. Then you have the opposite end of the spectrum where

my father knew a group leader who is a friend of his. And he said, ‘My daughter’s looking for a job at the lab. Do you have an opening?’

It’s completely, completely connections. I mean, that’s a really bad thing. I was valedictorian of my class, and people that are just barely passing classes got jobs before me. And they say that it’s based on your grade point average and the classes you take. But it’s really who you know—and I didn’t know anybody.

It’s really frustrating when people who are below you GPA-wise are getting jobs, and you’re still working at it. I mean, if it’s going to be solely based on connections, they should say that you have to know somebody. They shouldn’t say that it’s based on your merits and how good you are academically.

One of the biggest issues I’ve run into growing up here and living here is that the only way to get a job at the lab, it doesn’t matter what you know; it’s who you know. I had a bad time getting in until I approached somebody that I knew that worked here. I said, ‘Look, I’ve been trying to get in for some time. What pointers can you give me?’ The next week, I got a phone call.

Both the writers of the survey comments, and some interviewees, wondered whether it was possible to get a good internship placement at LANL that reflected their qualifications, experience, and interests without having ‘connections’:

I’m not so sure if all the on-line applicants get a fair chance at getting accepted at the labs. (1998)

While I think the on-line application process is a good idea, I’m not sure that it is actually used as a way to choose summer students by many employers. (1999)

The structure of posting student applications makes it almost impossible to get a job at the lab without having personal contacts. Speaking with mentors, they’ve suggested to me that they couldn’t find the students they were looking for.... (1998)

Everyone knows that for a person to get in, they need to have some kind of connection. I think that without a connection the on-line application would be almost useless. (1999)

They have a big database with all of the GPAs, and when they’re looking for a student, they get into the database. It doesn’t have your name or qualifications—just your GPA and this number that they assign to you. If they know someone, they know their number. So that’s how they do it. (Interviewee)

Because of this apparently widespread cynicism about the fairness of the hiring and job-matching system, these commentators encouraged prospective interns to be active in

contacting prospective mentors and department supervisors as a way to ensure both getting hired, and securing appropriate work placement within the program:

Make sure that interested students know that they should actively pursue employment at LANL if they want to get in. Many applications aren't even read. Students should be made aware that they should make direct contact with the groups they're interested in. (1999)

Note that students should actively attempt to get in touch with various staff members about being a mentor. That will result in more people getting to do the type of work they desire. (1999)

I had to get my resume into somebody physically—although they tell you that you're not supposed to contact people—you're not supposed to do it that way. But, you can't get a job unless you can get the information to someone—you have to make personal contacts. (Interviewee)

Whatever the extent of the nepotism alleged to operate in both the hiring and matching processes, these beliefs clearly undermine intern confidence in the fairness and appropriateness of both the hiring and job placement system, particularly (as suggested in the interview data) among female undergraduate interns, and, as such, may warrant further inquiry and consideration.

Survey Comments on the Efficacy of the Work Plan

Question 6B (1998 and 1999) asked, “How well did the work plan describe the work you actually did during your appointment?” There were 140 positive comments offered in the 1998 survey about how well the Educational Work Plan (EWP) reflected the work they did, and 129 such comments in the 1999 survey. Poor work plan-job matches were reported by 56 interns in 1998 and by 60 interns in 1999. The issues about which the interns wrote—whether complimentary or critical of the work plan system—were, however, extremely variable. Roughly half of all of the codes developed to encapsulate interns' opinions about the work plan were used only once in each year of the survey (i.e., 41 codes for 1998 and 30 codes for 1999). The distribution of codes used only once was proportionate across the positive and negative codes for each year of the survey, i.e., roughly half for both. Despite this, there were clear patterns in what interns appreciated, or found problematic, about their work plans: the issues that were raised with the highest frequencies (whether positive or negative) were the same for both years of the survey. In evaluating the usefulness of the work plan, the main criteria for their responses were: the influence of the internship on their career and education decisions, the benefits (or lack thereof) derived from the internship, and the factors contributing to a good (or poor) experience.

Interns' most frequent positive response was that the work they had done was what they had expected, given the description in their EWP (1998: n=31, 1999: n=22). Reports that their EWP's objectives had been accomplished were 22 in 1998 and 15 in

1999, and that the EWP had given their work a useful direction were 9 in 1998 and 21 in 1999:

The work plan described exactly what I have done this summer. (1998)

My work plan was very thorough and my work correlated well with my work plan. (1998)

All activities were described in detail, so I had a complete understanding of my duties and responsibilities. (1998)

The work plan described exactly what I would be doing and that is what I ended up doing! (1999)

My job assignment fit what I did. (1999)

We had a detailed discussion before I came, and I have accomplished every bit of what we planned on doing. (1998)

Work plan was created and outlined by ESH-1 team. Job assignments were assigned and flowed through to completion. (1998)

Carried out conceptual design of automatic power control system for advanced drilling. Very interesting. (1999)

Very good. I knew basically what I would be doing before I got here, which helped me to choose to come to Los Alamos. (1998)

The work plan gave me a goal to achieve as well as an expectation of what my summer work would be like, and I feel like this direction was very helpful. (1999)

Knowing what tasks I was responsible for up-front was extremely helpful. (1999)

A number of interns also described (in approving terms) their work plan as evolving and flexible, or ways in which it had been modified (1998: n= 17, 1999: n=25):

While I was here, my work plan was followed fairly well. Once I got into the work there were some things I branched off of and did more of, and some things that I realized were not as much of an interest to me as I thought they would be. (1998)

The work assignments started gradually in difficulty and slowly progressed, increasing my knowledge skills proportionately. (1999)

While I felt the objectives were a bit too easy—and I wanted something more challenging—my project continued to grow, and, in the end, I felt like I had accomplished something. (1999)

It was at first described in general terms then became more specific as the summer progressed. (1999)

Some interns were pleased that their work plans had allowed them a good deal of flexibility:

The plan was well described and easy to follow. There was enough flexibility to have fun and get the work done. (1998)

My assignment was clearly defined, yet there was significant flexibility for developing new ideas as they came along. (1998)

It was pretty flexible. So it turned out great, as there was no pressure and I learned a lot of new things. (1998)

I was given a lot of tasks and projects that I did end up doing, but others came up that I spent more time on. The work plan was very flexible and I enjoyed the additional projects. (1999)

My mentor gave me a lot of flexibility to pursue avenues that interested me during the course of my summer work. (1999)

[The work plan] outlined the major objectives of what I was to accomplish, at the same time accommodating flexibility for me to expand on my own and engage in more activities related to my project to round out my learning experience.

My work plan was fairly loose, as I tackled some projects that came up along the way, in addition to what we had discussed at the beginning of summer. (1999)

Several interns said that their original work plan had been modified in some manner. Indeed, there appeared to be a tendency for work plans to change somewhat once interns arrived at the laboratory (1998: n=13; 1999: n=20):

Work plan was modified when I got here. (1998)

Varied a bit from what my mentor and I had earlier talked about, but was still very related to my field of interest. (1998)

I was assigned to perform tasks exactly as they were defined on the work plan. There were some minor, but easily adaptable alternatives to the work plan. Excellent overall work experience. (1998)

My work plan was not fully followed to the letter, but helped to provide a structured road map of the type of assignments I would be working on. (1999)

Actual details of the work plan weren't worked out until after work had begun. There was some confusion in the beginning about the scope of the assigned tasks, but it worked out in the end. (1999)

In some instances, work plans were specifically modified to accommodate interns' interests, or in response to their input:

When I switched my major, my mentor found work that would pertain to my studies. My work plan changed, but was accommodating. (1998)

On the first day of employment, my supervisor and mentor asked me into their office to discuss my work plan....Together, my mentor and I discussed what I wanted out of this. (1998)

My work plan was up to me, so the work I planned was the work I did. (1998)

It's been an ongoing project for three years now. Much of its direction involves my input. (1999)

In other cases, work plans had to be modified due to mechanical difficulties or "real-world" limitations:

Because data that was supposed to be readied by the time of my arrival was not prepared in time, I was assigned another project. So we did discuss my projected work plan, but in the end, outside complications prevented my work on the project. (1998)

Situations beyond my control prevented me working on the project as planned. (1999)

The project I worked on was discussed long before I came here. Yet things unforeseeable, like the [equipment] breaking and classified projects that needed immediate attention, forced my mentor to change my project. (1998)

Work plan required dependence on other's projects, some of which did not materialize as expected. (1998)

My work plan was very difficult to execute due to constant problems with equipment in the lab. (1999)

As the above comments indicate, interns were tolerant about changes in plan caused by unforeseeable contingencies.

All of the factors that interns cited as contributing to a positive work experience (bulleted below) were also used as criteria to evaluate their work plans:

- Working in a position related to one's education or career goals (allowing interns the opportunity to reassess, reconfirm or refine objectives):

Gives me good hands-on experience with my field of degree. (1999)

I learned a lot about the potential applications of my schooling. (1998)

It gave a good feel for what a person in my chosen field does. (1998)

The work plan helped me to see the knowledge gained in school can be applied to work. (1999)

The work plan was really good. It enabled me to gain some valuable work experience in engineering. (1999)

It worked out very well. I have learned a lot about my field of study. (1999)

The work plan is very exciting to me, to carry it out. It might provide me with direction for my future scientific work, beyond my current appointment. (1999)

- Having the opportunity to learn new things:

I was told that I would be creating a data base system for the measurements laboratory, but I also participated in lab experiments as well, which was quite interesting and enjoyable. (1998)

My work plan turned out real well. I have learned new things almost everyday and broadened my horizons in technology and what computers are capable of doing. (1998)

My work plan that has been set forth for me was an exceptional one. I have gained knowledge in this field that I didn't have previously. I have really enjoyed and am satisfied with the overall experience. (1999)

The project I worked on was an extension to the project outlined in my work plan. I got the opportunity to learn what was stated in the plan, and to go beyond it. (1999)

- Having control over the work they were doing (working independently):

After my work plan was laid out, I was given almost free reign to complete the things that needed to be done. (1998)

I seem to have an extremely long rope. My work plan hasn't been very specific, but that gave me the freedom to pursue my own academic goals much more directly. My supervisor wants me to finish up and take a job here ASAP. (1998)

Just enough intellectual freedom to make me happy. (1999)

- Being engaged in work that was personally challenging and meaningful:

I liked being able to focus on a few specific projects and really get a feel for setting up and carrying out an entire project, all the ins and outs. (1998)

Fulfilling work, rather than grunt work. (1999)

I was very excited about my work because I actually got to have more responsibilities than was written in my work plan. (1998)

You wonder at first if you are going to be able to accomplish all that your group foresees from you. As the summer progressed, my group supported me by readily providing informational assistance when I had questions...I reached new levels. (1998)

- Variety in their work or projects:

I really enjoyed my work plan because it had a lot of variety. (1998)

I did not have only one project to work on. In fact, I had several throughout the summer. These were, for the most part, interesting and informative. (1998)

In a few instances, interns also mentioned positive experiences with their mentors:

They gave me an assignment and did everything possible to lend a helping hand. (1998)

[My mentor] does an excellent job at trying to keep me focused on one task at a time. He has taught me to arrange my tasks in order of importance. (1998)

Dr. [X] was good in that he let me choose what I wanted to work on. (1999)

My summer work plan was very reasonable, yet challenging. My mentor was excellent and took extra time out of his busy schedule to explain equipment, processes, and techniques. My mentor was always very helpful and knowledgeable and my work plan was great. (1998)

[My mentor] influences me to read and think about other problems that could be of interest or applicable to my degree. (1998)

In contrast to interns' positive evaluation of their work plan's contribution to the internship experience, interns who wrote about poor internship experiences often cited their work plan as contributing to their disappointments. These criticisms included:

- Performing work that was different from what they expected to be doing, given their work plan (1998: n=18, 1999: n=12)
- Being placed in an internship unrelated to their interests (1998: n=10, 1999: n=3)
- Work plans that were too vague to be useful (1998: n=6, 1999: n=9)

Other sources of negative EWP evaluations were offered in smaller numbers. These were:

- Not having been given a work plan or being unaware that such a thing existed (1998: n=4, 1999: n=5)
- Experiences with mentors that undermined the efficacy of the work plan (1998: n=5, 1999: n=4)
- Difficulties with security clearance that affected work plan implementation (1998: n=3, 1999: n=5)

Each of these issues is illustrated below.

- Performing work that was different from what they expected to be doing, given their work plan:

Was not what was expected. (1998)

The focus was supposed to be on network administration, but that's not what was emphasized. (1998)

The work plan I was hired to do, never entered my day-to-day work. (1998)

I was sent to work on gas chromatographs for several months; the work plan made no mention of this. Students should be advised beforehand of the extremely slow nature of R & D. (1998)

What was described to me as the work plan, and what I did, were not the same. (1999)

It turned out to be entirely different from what had been discussed before my appointment began. My mentor talked with me about the changes and gave me a chance to work with someone else, but I didn't want to hurt his feelings. (1999)

- Being placed in an internship unrelated to their interests:

Student applications should be more closely examined and students should be placed in a group in which the student has some interest. (1998)

Student programs personnel should place more of an emphasis on placing students in groups that perform work more relevant to the student's major and coursework. (1998)

If the laboratory were to help the students find a job here at the labs that related to one's major (in college) that would make things a whole lot easier. It seems like the lab just takes in our applications and just leaves us alone, not helping the student. (1999)

I gave a list of what I was interested in, but was put in an assignment, for most of the time, that I didn't enjoy or understand. (1998)

I wish my work plan would have been more challenging and that it had more to do with my major. (1998)

It could have included more technical work that would have been more applicable to my engineering studies. (1998)

Need to place students in areas where mentoring can focus on their training needs, not where the student's presence focuses on the group's needs. (1998)

- Work plans that were too vague to be useful:

The work plan wasn't extensive enough. (1998)

Was not descriptive enough of duties; mentioned one focus that was actually very minor assignment. (1998)

Before my appointment, my work plan was somewhat vague. I knew the general area I would be working on, but the specifics weren't discussed until after my arrival. (1998)

Needs to be better defined in the beginning. (1998)

The general topics were discussed but no specific projects. The topics were slightly vague. (1999)

The work plan was vague and broad. (1999)

My work plan was very vague, which made it very difficult for me to progress on my work without some time with my mentor (as noted above, this did not happen). I was also probably not a very good candidate for the work to begin with. (1999)

- Not having been given a work plan or being unaware that such a thing existed:

No work plan was developed for me. (1999)

There was no actual work plan. (1999)

I never really had a 'work plan.' I was never put on any schedule that I had to complete a project. I was never given a set project with actual guidelines, tasks, or milestones. (1998)

Last year, I had a work plan described to me, but this summer, there was no such attempt. I had no specific job to do for a few weeks until another team leader found a neat project for me to work on. (1999)

I was never really given a work plan. I was just shifted around on little jobs. (1998)

I wish I would have seen mine! (1999)

- Experiences with mentors that undermined the efficacy of the work plan:

Students need to be placed with their correct mentors right away. I was unaware of my true mentor until more than halfway through the summer. (1998)

I've had a number of different mentors during my stay at LANL...It seems kind of easy to get lost in the system. (1999)

Again, I did nothing I was originally told I would do because the woman I was supposed to work with did not expect me, and therefore, did not have a work plan for me.

They told me all the things I would do. Needless to say, I did none of them. People would assign me work and my mentor would do it for me before I would get to work. (1999)

- Difficulties with security clearance that affected work plan implementation:

My work plan said I would be doing mass spectrometer operations and glove box work, but I have done little of either one. This was mainly because I didn't have clearance yet, and some of the jobs required a clearance. (1998)

My work plan varied a great deal throughout the summer due to the fact that I was not able to accomplish any work in the area I was assigned. This was due to my lack of a 'Q' clearance. (1999)

Because I did not have clearance, my work plan changed. (1998)

The main problem I faced with work was that overblown security concerns kept me from getting the clearance I needed in order to do the meaningful work I was initially assigned to. (1999)

Interns' negative comments on the work plan also reiterated problems that were described in negative evaluations of the work experience: boring, repetitious, "busy" work, or not having enough work to do, were again offered as reasons for the poor quality of their experiences as interns.

However, there were, again, serendipitous accounts of interns for whom the internship was positive, despite their never having received a work plan, or the work that they performed being different from that originally set up for them:

I never really got a work plan, and I guess it would have been nice, but my mentors just gave me projects to work on for months at a time and we discussed problems as they arose. (1999)

Everything turned out better than planned, and I was very pleased. Nonetheless, it was not planned well at all. It just kind of fell into place on accident. I guess I got real lucky. Many students never really get a plan. (1999)

The team leader who hired me was apparently unaware of the needs of my mentor, so the work I did here was completely different from the original job offer description. The work turned out to be acceptable, although it was a bit of a challenge at the beginning. (1999)

While I enjoyed what I ended up doing, I never did the work that was described in my original work plan, which created confusion for the first few weeks. (1998)

It will be encouraging to the program organizers that the balance of comments on the fit between interns' work plans and their actual work that is offered in the surveys is, broadly, 70 percent positive and 30 percent negative. However, the survey comment evaluations of the Educational Work Plan should be read in light of the previous section that discusses how effectively the system that is intended to match interns to relevant work assignments operates in practice. Unless the formal matching system works as intended—on the basis of interns' qualifications, work experience, and interests—and is not undermined or circumvented by personal contact, the Educational Work Plan will be prevented from working effectively for all interns.

B. Interns' Perceptions of the Adequacy of Financial Support for the Internship Program

The program organizers asked the interview team to discuss with interns what they noticed about how well the internship program was supported by the departments in which they worked. (Information on this subject was not present in the survey data.) In the majority of interviews (34 of 47) one or more interns said that they had seen no

evidence that the internship program was other than well supported. In 22 interviews (15 graduate and seven undergraduate) interns expressed confidence that funding for the internships in their department was adequate. However, in nearly half of all interviews (21 of 47) expressions of concern were voiced about funding for the internship program. The majority of these (i.e., 18) came from graduate interviews where informants were, arguably, better placed than were undergraduates to offer an informed assessment of funding adequacy for their departments or research projects.

Interns offered the following as evidence that the internship program was adequately supported in their departments:

- Scholarships and/or help with tuition from LANL (reported in 10 groups: three graduate and one undergraduate)
- Research-related travel funding for interns
- Provision of resources and services that enabled their work (e.g., the research library, computer/technical support, use of LANL cars to run work-related errands, inter-departmental taxi service)
- Provision of extra-curricula services and activities: lectures, free access to the gymnasium, professional development, and special classes

The focus of concerns about program funding was different for graduates and undergraduates. Graduates (who were the majority of interns expressing concerns) worried about their academic and professional futures when they judged their departments to be under-funded, or where continued support for the project on which their graduate research was based was uncertain (expressed in 14 graduate interviews). Other graduate concerns focused on deficiencies in the tools they needed to do the work (for example, in four graduate interviews, interns reported lack of computer terminals at which to work), and on their need for career-related help (e.g., specific classes, a professional development program).

By contrast, the concerns of undergraduates focused on the conditions of their internships, particularly apparent uneven-ness of financial provision for interns among departments, which was seen to affect their placement choices. Concerns that funding for recruitment of minority interns may have been cut was also expressed.

Both graduates and undergraduates wanted to draw to LANL's attention the difficulty of working effectively where the transport system between departments was inadequate. Long waits for too few taxis were reported, resulting in lost working time. The lack of parking on LANL property for commuting interns was also cited as contributing to under-productivity and stress. (This is discussed in later sections on housing and living in Los Alamos.)

Uncertainties about funding for the internship program, for particular projects, and about the distribution of funds across departments also raised in 15 interviews the question of job security. Interns (in 12 interviews) who expressed confidence about their job security were notably male undergraduates in OS/GS positions. They had good

expectations that they would be able to return to LANL in future years and move into more advanced positions so long as they made satisfactory progress in school. LANL internships were seen as an important resume item that would increase their career choices. Concerns about the future of their positions were expressed in three focus groups with graduate interns in TSM positions, who discussed funding constraints on their projects.

C. Interns' Opinions as to the Adequacy of Their Salaries

A wide range of opinions was expressed across the 47 interviews that discussed the adequacy of the salaries offered to LANL interns. At one extreme, in 10 interviews—all of which contained graduate students—interns expressed only satisfaction. At the other extreme, the members of three focus groups with undergraduates were unanimous in their dissatisfaction with their salaries. In the other 31 groups, opinions were mixed. Overall, indications of satisfaction were more frequent than indications of dissatisfaction: expressions of satisfaction with salary were offered in 32 interviews and those indicating dissatisfaction were expressed in 15 interviews.

Interns of color expressed more satisfaction with their levels of remuneration than did white interns: positive remarks were offered in eight out of 14 all-white focus groups, compared with 13 out of 15 Hispanic groups, five out of eight Asian groups, four out of six African-American groups, and one out of four Native American groups. However, white interns also expressed less dissatisfaction—largely because they said less about salary (good or bad) than did interns of color. Only in three (of 14) did white interns express negative views, compared with six (of 15) in Hispanic groups, three (of eight) in Asian groups, and interns in all four of the Native American groups. Only in the six African-American groups did no one express dissatisfaction with their level of pay.

More men expressed dissatisfaction with their salaries than did women: complaints were registered in 10 of the 24 interviews with male interns, compared with six of the 23 interviews with female interns.

In 26 interviews, interns offered relative assessments of their salary that took personal factors and/or the local context into account. This group of comments offered most information about the criteria by which interns evaluated their salaries. Interns judged the value of their paychecks largely by the high cost of living in the Los Alamos area. For those interns coming from other parts of New Mexico, or from another state, salary levels seemed high when compared with salaries in the rest of the state, with graduate student stipends, and even (in some cases) by industry standards. However, it is the high cost of housing in the Los Alamos vicinity that determines the actual value of salaries. Those undergraduates who were local residents, living with family members and paying little or no rent, expressed more satisfaction (or less dissatisfaction) than undergraduate interns from farther away or graduate interns (fewer of whom were local). For this reason, it may be best to consider this section in tandem with the following section on housing.

D. Interns' Observations on Their Housing Situation

Findings from the Interview Data

In all 21 of the interviews with graduate students, and in 20 (out of 26) of those with undergraduates, interns spontaneously raised housing issues. In 73 percent of these groups (30 of 41 interviews), interns defined housing as a problem. In 19 focus groups with TSM graduate interns, discussion focused on the limited supply, poor quality, and high cost of housing in the Los Alamos area. Undergraduates were less affected by housing problems, especially those in OS/GS positions and who were the most likely to be living locally with parents. Housing concerns were also far more commonly and strongly expressed in interviews with women (14 of 23) than in interviews with men (five of 24). Graduate women in science and technology positions expressed more concerns about housing than any other group.

Those who had worked at LANL for one year or less (13 interviews) also experienced more housing difficulties than the interns who had worked at LANL for more than one year (6 interviews) and had found ways to resolve their housing problems over time. For example, two graduate and two undergraduate interns had bought homes in the area.

In 17 interviews, interns indicated that, either they had solved a housing problem, or that it had never been a problem for them. This included 11 graduates in TSM positions and eight undergraduates, seven of whom were in OS/GS positions. In only four interviews (three graduate and one undergraduate) did interns report that they had found good, affordable housing. This undergraduate credited LANL staff with helping him to find a place to live.

Findings from the Survey Comments Data

Interns' observations on housing (and transportation) were recorded only in the 1999 survey (Question 15). There were 216 comments on housing and transport issues, taken together, in which 64 different issues were raised. The comments on housing are discussed in this section, and those on transportation are presented in the following section (on living in Los Alamos).

There were 176 discrete comments on housing covering 50 different issues. Some of these (n=29) were raised only once. Of the 176 statements by interns about housing, only 17 were positive. In 10 individual statements, interns wrote that their housing situation was satisfactory, and five interns praised the housing staff personnel for their help:

The quad my roommate and I ended up renting was quite affordable and in a decent location.

UNM-LA provided good housing.

Housing at 9th St. Apartments were just fine. Can't really complain.

Housing at LA apartments was adequate. Housing office was quick to respond to problems that arose.

I was very grateful for the help I received from the Student Program for finding housing.

The Housing Office was terrific.

One intern wrote that housing benefits were a good idea (though the speaker acknowledged, "it doesn't apply to me") and another observed that LANL salaries were sufficient to meet housing needs.

There were, however, more than five times the number of negative observations (n=91) than there were positive (n=17). As in the interview data, interns' problems with housing included high cost, poor quality, and limited availability; they also wrote about their time and trouble in finding somewhere to live. Many interns wrote in angry terms:

Thanks for ripping off the students with cramped, cheap housing. It costs about as much to live in Boston, but this is the middle of NOWHERE!

The housing was way too expensive for what I got. I mean, \$530 for one room and two people??? Need I say more???

Housing is horrible...Cost is way too high for such small places, even here in Los Alamos.

Housing sucks. \$500 a month for a hole in the wall is not worth it.

Student housing was a joke. How could you put students in a hotel room, double occupancy, and charge them \$375 a month with no kitchen?! I ALMOST camped out for the summer, until I found a decent rental in White Rock that didn't cost an arm and a leg.

Housing is outrageous! The 'apartments' are very unsatisfactory.

UNM housing: small cube of a living space with a kitchen in a closet.
The housing shortage was a pain this year, especially since we had more students this summer than last summer.

The lack of student housing is inexcusable for this laboratory.

Housing! Is there any???

The search for affordable housing was exacerbated by the limited amount available, and tight competition that forced prices higher. Interns described the lack of good housing at a reasonable price as a chronic problem that had been insufficiently addressed:

It would be helpful if more student housing were available. It was difficult for me to find somewhere to live because all student housing was full.

The housing situation in Los Alamos is terrible. I decided to come back to the labs late in the semester and by then all lab-subsidized housing was filled.

There really needs to be something done about housing for summer students here. I was in a panic when I was looking for a place to live out here because there didn't appear to be anything available for me. I thought I was going to have to live in a tent.

Something really needs to be done about the housing situation in this town. Current conditions seem really cramped, worn down, and way too expensive.

There really needs to be something done.

Several students came to the inevitable conclusion that the high cost of housing (often combined with the additional living costs created by lack of access to a kitchen, even in student housing) meant that they could not save any money from their summer earnings. Local interns, who did not have housing difficulties, were often very sympathetic to other interns' plights:

Housing should include a small kitchen, because the price to eat out all the time is very high. Especially when one's paycheck does not correspond with the outrageous prices.

Housing is much too expensive. The money that we make working here is spent on living expenses and we are not able to take very much money back to school with us.

I wish the Los Alamos citizens cared enough to give students good housing locations. If I wasn't living at home, I could not afford to come live here. Housing would kill any hopes I would have of saving any money for the summer.

Not really affected by it, but housing has to be addressed. I would hate to live in a hotel for a summer. Eating out every meal would make it very hard to save much money.

My job at LANL is good ONLY because it pays well and has good benefits. I live with my parents, but if I did not, this job would not be worthwhile. Students complained that they needed to work two jobs to survive.

Not all interns had found the housing staff (or those associated with operating housing) pleasant or helpful:

The housing situation is rather unsatisfactory. The woman in charge of the LANL-owned Iris St. apartments...is unnecessarily unpleasant to work with.

Very few people actually liked the people we dealt with in housing.

I have heard nothing but negative things about housing (about the housing staff and housing itself) from students that I work closely with through each summer.

According to hearsay, some interns were choosing not to return to work at LANL because of difficulties associated with finding housing in Los Alamos:

Housing? Transportation? HA!...Many summer students I met this year had trouble finding a place. I know one undergraduate physics student who chose to work at Fermi because housing is so expensive here.

Housing SUCKS. Let me say that again: S-U-C-K-S. The housing situation here managed to single-handedly turn off a number of people I've met here from wanting to ever come back.

Some interns addressed their remarks directly to LANL, asking them to improve the housing situation:

There needs to be more housing at a more affordable cost.

The housing needs to be improved. There is not enough.

It would be nice if the lab helped more regarding housing.

Very hard to find reasonably priced housing. Needs a lot of improvement.

The lab really needs to open the town up more to outsiders, especially in the housing arena. It's nearly impossible to find short-term housing in this town.

Interns also asked for housing options for married couples, and also for interns who had parents living nearby, but wished to live independently and close to their work.

Clearly, finding appropriate housing at a price that interns can afford is a common and pressing problem that can undermine the benefits of working at LANL. The interview data indicated that housing problems disproportionately affect newer graduate interns, and most especially graduate women in science and technology positions. Whether and how LANL could address the provision of affordable adequate accommodation for interns—perhaps by increasing their provision of student housing

with kitchen facilities—would seem to be a matter for urgent consideration, especially given its impact on graduate women, and, thereby, on their recruitment.

The housing difficulties described by interns are closely related to their observations on living in the Los Alamos area, particularly commuting difficulties. These are discussed in the following section.

E. Interns' Observations on Living in Los Alamos (Including Transportation Issues)

Findings from the Interview Data

Living in the Los Alamos area informs the overall internship experience. There were three main things that interns liked about the area:

- Its natural beauty
- For local interns, the convenience of summer work
- For interns with families, a good, safe place to raise children

Interns in 13 interviews (two graduate, 11 undergraduate) described what they liked about living and working in the Los Alamos area. By sex and race/ethnicity these groups were: four male, nine female, four White, three Hispanic, three Asian, one Black, and two Native American. By nature of work, they were 11 in science and technical work, and two in administrative positions. In six of these groups, interns were returning to LANL for a second or subsequent internship.

There were over twice as many complaints about the problems of living in the Los Alamos area as there were positive assessments. Many of the complaints derived from the difficulties of finding affordable housing in or near Los Alamos, from its geographical isolation, and from its lack of the kinds of amenities to which many of the visiting interns were accustomed:

- For those interns driving to Los Alamos each day, the commute was reported to be time-consuming, slow, clogged with traffic, and sometimes dangerous due to speeding drivers on mountain roads. This issue was discussed in 16 interviews (six graduate and ten undergraduate). In four interviews, interns chafed at the necessity of acquiring a car in order to avoid small town isolation, and interns in further interviews pointed to insufficient parking for commuting interns.
- In 16 interviews (three graduate and 13 undergraduate) interns bemoaned the disadvantages of a small town that lacked entertainment, had too few restaurants, and that these closed too early.
- Coming to live at LANL for the summer was reported to be stressful for two married undergraduates.

These problems were raised in 29 interviews (nine graduate and 20 undergraduate), 11 of which were composed of interns who were returning for a second or subsequent internship. By sex and race/ethnicity, 14 of these interviews were with men, 15 were with women, seven were with white interns, 10 with Hispanic, four with Asian, four with African-American, and four with Native American interns. By nature of work, they were 23 in science and technical work, and seven were in office/administrative positions.

Clearly, many of these difficulties, especially those related to commuting, derive from the housing problems of interns discussed in the previous section. Also in light of these comments, the Program Directors' efforts to augment the city's entertainment options with social activities for interns may also be seen as worthwhile.

Findings from the Survey Comment Data

Interns' comments about transportation were offered in answer to Question 15 in the 1999 survey only. As indicated in the last section, this question covered both housing and transportation issues, and there were just 40 comments and 13 issues specifically on transportation. Of these, 13 comments were positive, seven were negative, and 20 offered advice or general observations.

The topic most frequently commented upon was LANL's taxi service. Of the 18 interns who wrote about the taxi service, 11 were appreciative and seven offered criticisms. Positive evaluations (which were especially complimentary about the taxi drivers) included the following:

The taxi idea is great, especially for students without a vehicle.

I love the taxis. They got to know me after a while and the drivers are so friendly.

The taxi service is a valuable service and most of the drivers are friendly.

The transportation was excellent. The drivers were very friendly and helpful.

Lab cab is efficient and usually punctual.

Taxis are a big help.

Seven interns had not found the taxi service adequate to their needs. In the interview data findings (discussed in section 5B on the perceived adequacy of funding for the internship program) interns highlighted difficulty and delays in getting taxis, and the negative impact of this on their work. Further, the survey complaints drew attention to the non-standard hours that interns work, and the distances between work locations:

If I come back next year, I'm bringing a car with me. Being dependent on the taxi was not a good experience. I work out in TA-46 so walking was out of the question.

The taxi service should NOT stop running 30 minutes before the work day is over!

Transportation could use improvement, especially on weekends when I need to go to the lab and the taxi isn't running.

In a further 12 comments, interns asked for improvements in the taxi service that would meet some of these needs:

It would be nice if the taxi service ran longer hours.

If the lab taxi were available until 5:30p.m., that would be very good.

I think the taxi service should be advertised.

As in the interview data, respondents to this question pointed to problems in getting to work. Three interns who commuted to work complained about traffic jams, highway construction, and the high local price of gasoline:

I commute everyday from Pojoaque. The traffic approaching TA-3 is horrible in the mornings.

Transportation sure is a mess this summer, with traffic routed through Canyon Rd. blocked, and now the work on E. Jemez. This has doubled the time it takes me to get to work. (And, of course, one can't walk to LANSCE from town.)

The cost of gas in Los Alamos is ridiculous!

Twelve interns asked LANL to help by considering a shuttle service (that also runs on the weekends) to and from local cities where interns have found housing:

Transportation to out of town is virtually non-existent. Very hard for people without their own vehicle.

Shuttles to Otowi at lunchtime would be convenient and help alleviate a lot of traffic congestion.

It's really terrible that the shuttles to and from Santa Fe stopped. Having a reliable source of transportation would probably encourage a lot of students to live in Santa Fe, and it would also allow students without cars to enjoy Santa Fe on the weekends.

Transportation to and from Albuquerque could be helped. I know of people who would like to see a bus system...like the shuttle jack, etc. If there is something, it's not well advertised.

Since I don't drive a car, it would be nice to have some shuttle running to Santa Fe and back. Not frequent, just a few times a day, strictly on schedule, but not expensive (below \$8-9 one way). It would be good to have it on weekends too.

As with the interview data findings, the survey comments stress the essential connection between the housing difficulties of interns discussed in the previous section, and, thereby, their evaluation of the overall internship experience. The interns' discussion (in both data sets) of the value of the on-site taxi system, but also the need to improve and extend the service, highlights the connection between transport and the work productivity of interns.

F. Interns' Observations on the Utility of the Student Programs' Web Site

Qualitative information on the Student Programs' Web site was offered only in the survey comment data (as Question 10B) following Question 10A: "How would you rate the information provided for you at the Student Programs' web site?" Across both years of the survey data, there were 157 individual observations about the web site, including 81 that were evaluative, 33 offering advice, plus 43 general observations. Of the evaluative comments, 54 (67%) were positive, 19 (23%) were negative, and eight (10%) gave mixed reviews of the site's utility. More observations were offered in the 1998 survey (n=92) in answer to this question than in the 1999 survey (n=65), and more of the evaluative observations in the 1998 survey were positive (i.e., 37 in 1998 versus 17 in 1999). Otherwise, there were no differences of note between the two years.

However, for both years of the survey, there was a high number of issues mentioned only once (i.e., 1998: 23 of 37 issues, 1999: 15 of 25 issues). Laying aside these idiosyncratic observations, plus those of interns who wrote that they had never used the site (n=19), or chose not to offer a comment (n=16), the actual number of issues addressing the efficacy of the Student Programs' web site is quite limited and very focused: it reduces to 10 issues for positive evaluations (half of which were offered just once), and six for negative evaluations. Of these, only four types of comment in the 1998 survey data specifically referenced the web site: the remainder actually addressed interns' comments on aspects of the Student Association. In the 1999 survey data, positive comments referenced only two issues that specifically concerned the Student Programs' web site.

The single most commonly offered group of observations about the Student Programs' web site was that it was informative, user-friendly, and an effective means by which to convey information to interns (1998: n=22, 1999: n=16):

Web site was very informative and gave a lot of information out to students that we may have not been able to receive. (1998)

Wonderful! Very informative and up-to-date. The best source of information in the whole lab. (1998)

Interesting! Lots of great information. (1998)

I surfed this web site often for useful information. (1998)

Everything is great and it's very simple for students to get the information if they really want to. (1999)

I was able to refer to the site for answers to my questions. If an answer was not found, the resources listed always gave me proper guidance. (1999)

The web site is very helpful. It allows students to see what is going on. It always gives you a description of the different programs, which is nice to be able to read and to know. (1999)

The second most-commonly offered positive response, was that, although the writer had rarely used the Student Programs' web site, it was found to be helpful when accessed (1998: n=14, 1999: n=1):

I haven't used the web site much, but usually when I looked there to find something I needed, I found it. (1998)

Seemed good when I used it, but it was not very often. (1998)

It was good when I needed to look stuff up, but didn't need to much. People told me almost everything I needed to know. (1998)

Honestly, I didn't frequent the page, but I could always find most of the information I needed when I did visit the page. (1999)

In the 1998 survey data, 18 interns said that they had never used the web site, and in the 1999 data, five people said that they had never accessed it:

I honestly never used it. (1998)

Never looked at it. (1998)

I actually never took advantage of the web site. (1998)

Don't think I ever visited the site. (1999)

Two interns (one from 1998 and one from 1999) were unaware that the web site existed:

What student programs' web site? (1998)

I didn't know about the web site. (1999)

For both years of the survey, the total number of negative comments offered by interns was low (1998: n=8, 1999: n=11). Interns' most common complaint about the Student Programs' web site was that it was not kept up to date:

I found out the hard way that not all the information has been updated. (1998)

I could have done it better. There were too many links and posted information that was outdated. (1998)

It was never up to date when I checked to see what events were going on. (1999)

Keep it updated. In particular with regards to trips and seminars and listings of extra-curricular activities.... (1999)

Make sure it is updated. (1999)

Other problems reported by interns included difficulties: accessing the web site, finding specific information, and problems with links that would not open (1998: n=4, 1999: n=9):

I was unable to connect to the web site. (1999)

If I had a specific question, it would take weeks to get a definite answer. (1998)

I find it hard to get around the lab's site as a whole: there's so many pages that finding the one you want often involves a fair amount of hunting. (1999)

Maintain the links. It's annoying to click through to a dead link. (1999)

It may have just been my computer, but I had difficulty opening several of the links. (1999)

More interns offered advice about how to improve the Student Programs' web site (1998: n=18, 1999: n=15) than offered complaints about it. Interns wanted the following:

- More and different types of information to be posted on the web site
- Ways in which to communicate with, or learn about, the people working at LANL
- Numbers and names of people to contact about specific questions
- Current job listings
- Updated information about student activities
- Help in finding housing
- A listing of various LANL procedures and directions they should follow

I would like to see more specific information/contacts/resources posted on the web site for students who want to develop an ongoing relationship without

securing a long-term/ permanent position with potential researchers/employers here at the lab. (1998)

Be sure to list the phone numbers of points of contact in the Student Programs. (1998)

I would find it useful if there were easier access to who is working on what and why, to facilitate the formation of collaborations and discussions. (1998)

More information about the students that are currently here would be kind of interesting. Maybe some facts about where they are all from and what they are majoring in and various facts like that. (1999)

Need more names and numbers of people to contact with questions. (1998)

It would be good to make it more obvious about who to contact for the various tours offered. (1998)

Maybe advertise job openings for students. (1999)

Maybe a job listing for student openings. (1999)

All the picnics and volleyball things need to be announced more so that there would be more attendance and things for out of town people to know about. (1999)

The lab could maintain a web page containing the names and phone numbers of LA residents who are hoping to rent rooms for the summer. (1998)

It would be nice if this web site had more information or links about living in or near Los Alamos...The web site should have pages tailored to helping students who have never been here find housing. (1999)

Provide exit lists of what students have to do for specific things. Examples: how to check in, how to check out, get a badge, find group/mentor, etc. (1999)

Include the exit procedures somewhere on it. (1999)

I never saw anything on LANL scholarships, which I think would be useful. (1998)

Sometimes I hear of scholarships and from other sources, and when I look on the web site they're not mentioned. (1999)

The Student Programs' web site thus appears to be valued by those who use it, but could usefully be expanded to meet a wider array of needs. It also appears to need the

kind of technical maintenance and updating of content (and an allocation of regular funding to secure them) that are generic features of web sites.

G. Interns' Sense of Community and the Role of the Student Government Association (SGA) in Fostering It.

Asking the interns whether they felt they were part of a community provoked considerable discussion and little agreement in the 41 interviews that discussed this issue. In 35 interviews, some of the interns reported that they had experienced LANL as a community, while in almost as many interviews (32), other interns argued that they felt a limited, or no, sense of community. It became clear that far more of the interns in undergraduate interviews (22 out of 23) than those in graduate interviews (13 of 21) felt that they belonged to a community.

The following observations were offered either exclusively, or mostly, by undergraduate interns to explain why they felt a sense of community at LANL:

- Liking their co-workers and/or appreciating fellow interns
- Being treated as equals by the regular staff
- Being treated with respect and given responsibility
- Having a good relationship with their supervisor
- Experiencing fairness and even-ness in the enforcement of rules
- Experiencing good communication with other departments, and appreciation of efforts to promote inter-departmental awareness (e.g., the poster session)

In addition, both graduate and undergraduate interns thought that student housing helped to promote a sense of community among interns (as well as providing affordable accommodation).

One consequence of experiencing LANL as a community was that it promoted an inclination to return among undergraduates.

Whether positive or negative in nature, undergraduate observations tended to focus on the social context of their work, whereas graduate interns' observations were more focused on the nature and conditions of the work itself. Thus, where undergraduate interns felt that the sense of community at LANL was missing or limited, their reasons again referenced the atmosphere or social milieu in which they worked:

- Discord (and concern about low morale) among regular staff
- Little support from regular staff for community building in their department
- No sense of connection with anyone outside their department (and the felt need for more cross-departmental contact)
- Rumors of poor treatment of individual interns
- Insufficient contact with student advisors
- The politics of doing government work (seen as inhibiting development of a sense of community)

By contrast, graduate observations on lack of community emphasized:

- The constant pressure to complete work and produce results leaves no time for community building
- Uncomfortable, cramped working conditions that undermine sociability
- The low status experienced by graduate interns in their working units
- Lack of peer advisors

Graduate interns' views on what promotes good feelings of community were, again, work-specific:

- Getting support from more sources than their mentors
- Appreciation when their work is not “micro-managed”

In nine graduate interviews, interns lamented the lack of connection with other graduate interns. In four more interviews (three graduate and one undergraduate) interns noted that graduate and undergraduate interns are seen (and see each other) as different populations with no sense of connection. At the extreme, some interns (both graduate and undergraduate) felt entirely isolated and reported only limited connection with co-workers. In three interviews, interns with more than one period of experience at LANL thought that communication had improved, but needed further improvement.

A recurrent theme that cuts across discussions on a variety of topics was the difference in the quality of the internship experience for local and non-local interns. Local interns expressed appreciation for the economic, educational, and social contributions to the local community made by LANL, and felt bonded to “the Lab” because of these linkages. Interns who were not local observed that it was harder for them to become part of the wider community, and that it was not always easy to find it within LANL.

Also recurrent across topics were the distinctive experiences reported by the minority of interns who are married. In this case, being married limited involvement in LANL community activities and fostered a degree of detachment from other interns.

Role of the Student Government Association (SGA)

One of the functions of the SGA discussed both in the interviews, and in the survey comments, was the effectiveness of its social program in creating a sense of community among interns. Given the rural, rather isolated, location of LANL, and the limited commercial recreational facilities of Los Alamos (discussed by the interns), one might predict that the SGA's organized social activities would be appreciated. Survey Question 13A asks, “Do/did you participate in any of the Student Association activities? And Question 13B asks, “If yes, how would you rate them?” These questions solicited 330 individual observations about SGA activities that were evenly divided between the two survey years and reflected 50 different types of response. Of these single observations, 65 percent (n=145) of the comments evaluating the SGA's contribution

were positive; 35 percent (n=79) were negative. Additionally, there were 42 pieces of advice about how to improve what was offered, and 63 non-evaluative observations.

The interview data broadly support the pattern of largely positive evaluation, but also highlight some differences between sub-sets of the interns in their evaluation of what the SGA offered, and in their level of participation in SGA activities. All but one of the undergraduate interviews contained some discussion about SGA social activities that was appreciative. By contrast, graduate interns had little to say about SGA activities in their discussions of community life at LANL. The topic was discussed in only nine (of their 21) interviews. In only one interview did graduate interns report high participation, with slight participation reported in three other interviews. The rest of the graduate interns interviewed appeared to be either uninvolved or disinterested.

Taken as a whole, interns' survey responses portray the SGA as playing a useful role in developing a sense of community at LANL for an (unspecified) proportion of the interns. The activities provided by the Student Association offered interns the chance to meet one another, learn about various aspects of the lab, and to have fun together in their off-work hours. The most frequent positive comment was that the SGA had done a good job in offering them a variety of activities (1998: n=22, 1999: n=17). Some writers offered their congratulations to the leadership within the Student Association, saying that they had done a good job and deserved credit for their hard work (1998: n=8, 1999: n=3):

Glad to see there are many activities: both social and educational. Keep up the great work. (1998)

The Student Association does a fine job of providing a variety of activities for students. (1998)

The activities added greatly to my experiences while in Los Alamos. (1998)

I commend the Student Association in their goal to provide both educational and social opportunities for the students across the laboratory. (1999)

A nice variety of activities to participate in—from tours of laboratory areas to swing dancing. (1999)

I enjoyed all the activities...It provided a nice forum to learn about Los Alamos and the ins and outs of LANL. (1999)

[X] and the rest of the Student Association Executive Board did an outstanding job scheduling a wide variety of activities. (1998)

It is obvious that several devoted individuals put a significant amount of time into programming and planning: the events are well coordinated and planned. (1999)

[X] and the other students who organized the activities were great. (1998)

I think that the people involved in running SA are to be commended for doing a very good, difficult job. (1998)

The primary benefit of participating in Student Association activities was reported to be the opportunity to socialize and make new friends (1998: n=14, 1999: n=9):

The SA activities were one of the main ways I met people and found out about things to do this summer, and I really enjoyed them. (1998)

A great way to meet new people here at the lab. (1998)

They were a great way to meet people and to not stay at home bored with nothing to do. (1998)

These were definitely very beneficial, especially at the beginning when I knew very few people. (1999)

They provided a good opportunity to get to know other students from around the country. It was great getting to meet new people from different universities and colleges. They provided many interesting perspectives. (1999)

The SA activities were useful in meeting new and exciting people. I wish I was able to attend more. (1999)

Interns specifically mentioned the tours, talks, trips, barbeques, and dances organized by the SGA as activities that they particularly enjoyed (1998: n=21, 1999: n=26). Again, they emphasized the chance to meet people and make friends:

I love the Saturday outings to Santa Fe. They were a great way to meet other students and have fun. (1999)

The geology field trip was GREAT! (1998)

The tours were especially intriguing. (1998)

All events, especially the NTS trip, were wonderful. I received exposure to many different aspects of what LANL does. (1999)

Good meetings, speakers and extra-curricular activities. (1998)

I went to barbecues and once to the opera. It's a great way to meet people, and several of the trips allowed students some sight-seeing. (1998)

I participated in the student picnic. It was a great way to meet students. (1999)

Sock hop was great, as were movie nites. (1998)

I especially enjoyed swing dancing and the student parties. (1999)

Several interns who said that they had been involved in SGA activities to a limited degree (1998: n=6, 1999: n=11) also said that they had enjoyed the events they had attended:

Unfortunately, I was unable to do a whole lot with the SA. I did however go to a couple of meetings; very good and informative. Got old and new students involved. Especially liked how they got students involved in 'out of work stuff,' like movies and dinner. (1998)

I have to admit, I was not greatly involved in student activities, but what I was involved in, I enjoyed. (1998)

I only participated in a few, but I am glad the many options were available. (1998)

I only went to one activity, but it seemed to be a good way of getting involved with the other students. (1999)

I did not participate in many of the events, but the ones I did attend, I enjoyed. My favorite event was the rafting trip. (1999)

I don't think I went to enough of these to give a good opinion. I did go the northern New Mexico tour though. That was very good: cheap and very fun.

A number of survey comment writers wished they had participated in student activities more:

I should have done more with this. I am sure they were great fun. (1998)

I live here and have friends that I want to spend time with before we leave for college. I think it's a great idea and am somewhat sorry that I did not participate. (1999)

I wish I was able to attend more. (1999)

Interns who had not participated much offered a number of reasons, including conflicts with work and family responsibilities. For those who lived some distance away, commuting made it difficult to take part (1998: n=8, 1999: n=7):

Sorry. I commute very long distances every day, so I wasn't available for student activities. I was busy working during the day, so I didn't go on tours. (1998)

I want to attend, but this summer has been very busy, so I haven't had the chance. (1999)

Was too busy to attend. (1998)

I did not participate as much as I would have liked to because most activities are after work, and I rush home to be with my two daughters...I read the activities on my e-mail, and it seems like a lot of fun. (1998)

I never had time for them. (1999)

I did not participate because I live out of town. If I would have lived here I would have participated more. (1998)

Interns who lived in Los Alamos said that their participation in Student Association activities was limited because they had family and friends in the area, and thus were more inclined to do things with them rather than spend more time at LANL. However, they too commented positively on the Student Association activities they had attended, or expressed interest in doing more with the Student Association:

Excellent! I grew up in Los Alamos, and so I have my family, church friends, and some old high school friends to do things with. However, I keep in touch with the SA and watch for things that interest me. (1999)

I grew up in Los Alamos, so it has been hard to feel motivated to get involved in the Student Association. I would like to join in the fun, but haven't pushed myself to do it since I have other networks of friends already established. (1999)

Seems like they would be good. I'm from Los Alamos, so I haven't done anything yet. But I am going to go on a tour. (1998)

Some of the local interns also commented that the Student Association was great for "non-locals":

If I were new to Los Alamos, I would really appreciate all of the activities the SA has to offer. (1999)

Everything seems fantastic, but being a lifetime local, it doesn't really apply to me. The activities are great incentives for students who want to move out here to work. (1999)

The student activities seem to be for students who are not from Los Alamos. (1998)

However, some survey respondents noticed that fewer than expected participated in SGA activities, and that the same group of people always seemed to be the ones involved. In 19 interviews (17 with undergraduates) at least one intern reported that they had not been involved in SGA activities at all. In 13 interviews (10 with undergraduates) at least one intern registered only a slight level of involvement. Some of those who had

attended also noticed the pattern of high involvement among a sub-set of interns, and low interest among the rest. In only three interviews (two with undergraduates) did interns indicate a regular participation in SGA activities:

I had a great time at almost all the activities I participated in. I was surprised, though, at how few students got involved. (1998)

I was impressed by the amount of accomplishment SA were able to achieve with such little participation on the part of the majority of the students. (1998)

More students need to be encouraged to come to SA stuff. (1999)

I thought the segment of the population represented at the SA activities was a pretty limited one. (1999)

I found it odd that only a very small number of students took part in SA events, but there were plenty of events offered and all were enjoyable. (1999)

Many students tend to stay in their own circle of people...The majority of people who go on the tours are usually the ones you will see at the student activities. (1998)

The same people were always at the events, and very few new faces ever appeared. (1998)

Interns in 22 interviews saw SGA activities as intended “for somebody else,” and as uninteresting or inappropriate for them. This point of view was offered, as indicated earlier, by interns in particular sub-sets of the interview sample—notably, graduate interns and local interns. Graduates thought the activities were geared more to undergraduate interests, although some thought they would take part if this emphasis were changed. Some graduate interns described themselves as too busy with their projects to be involved. Local interns—especially those who were married and/or had children—saw SGA activities as less relevant for them, although, as in the survey responses, they thought them useful for visiting interns. A small number of survey respondents also described the SGA activities as “not for me.” (1998: n=3, 1999: n=2). Older interns were put off by the fact that Student Association activities targeted a younger age group (1998: n=3, 1999: n=4):

Not my cup of tea. (1998)

Some were good ideas, like the barbecues, but it was just that the people that attended weren’t the kind that I really wanted to be around all that much. (1998)
The people who went on the hikes were a bunch of boring nerds. (1998)

They were awful ‘geeky.’ Unfortunately, they were not fun for the ‘normal’ student. (1999)

Some of the activities just didn’t seem to interest me. (1999)

The [activities] are geared to “traditional” students, 18-24, no family/concerns/responsibilities other than school. This is an outdated system. (1998)

As an older person, the activities were geared toward a younger group. (1999)

They seemed geared for 18 year-olds, which is why I didn’t participate. (1998)

The Student Association tries to simulate a college environment too much. They should make the entire experience more of a professional situation. (1998)

In so far as the SGA is concerned to reach out to students of color (especially those living away from home), it was also notable that the “not for me” attitude to SGA activities was expressed in half of the interviews with students of color (16 of 33), compared with about one-third of the white interns’ groups (5 out of 14). Some part of this may, again, be explained by the disinterest of Hispanic and Native American interns who live locally. Also, as is discussed later in Chapter 7 (on race/ethnicity), foreign interns described actual exclusion from some official activities for security reasons. They also felt excluded (whether formally or not) from some SGA activities:

[It] would be nice if foreign nationals were not excluded from some activities. (1999)

Some interns thought that insufficient advertising of events hindered greater participation (1998: n=6, 1999: n=2). In each year of the survey, a very small number of interns had never heard about Student Association activities (1998: n=2, 1999: n=3). This observation was echoed in the interviews where some interns were unaware of the SGA’s e-mail newsletter, and others suggested improvement of the existing web page:

I only went on one activity because I never heard of any more. I had no schedule or anything like that, and I never got e-mail from anyone. I thought I would be informed of upcoming activities, but I never was, which was disappointing. (1998)

The only problem I came across was that I never received any e-mails informing me of these trips until they had already happened. The only reason I found out about them was another student at my office would inform me when she received them. (1998)

I wish there were more [activities], and I wish they were better publicized. I only heard of them through my friends. (1998)

I rarely, if ever, heard about any of the student activities. I'm not even sure about what I missed, if anything. The Student Association has great need for better communication between the association and the actual students. (1999)

Many students didn't even know that [the Student Association] existed. (1999)

What are Student Association activities??? (1999)

Very few interns felt that Student Association activities were poorly planned (1998: n=3, 1999: n=2), and just three interns who, after participating in particular activities, decided not to attend any more:

The Las Vegas trip was disorganized, and could have been much more fun had someone taken decisive leadership of the group. (1998)

Trips should be handled by someone who knows what they are doing. (1998)

The movie selections weren't too exciting; the BBQs could use some more organizing (e.g., for activities) and better food. (1999)

I did not participate this year due to the inadequacy of the last one. (1998)

After going to an SA meeting, I didn't feel comfortable to participate in any activities. I didn't feel that it was a friendly environment. (1998)

Trips are poorly planned; plans are not discussed with trip participants. I wish not to go on any more SA trips. (1999)

In addition to the advice embedded in their criticisms, interns in 18 interviews suggested ways to improve the level of participation: better communication of events, more attention to the interests and needs of graduate interns, more family-focused activities, more funding to improve the quality of offerings, and better management/more staff support for the SGA. These suggestions (and more) were echoed in 42 pieces of advice offered in the survey data. The most frequently offered suggestion was that the SGA should improve the ways it distributes information to interns. More timely notification of their activities was predicted to encourage greater participation among a wider cross-section of interns:

I didn't receive information about student activities unless I took the time to look them up on the Web. (1998)

You need to get people more informed of activities. Most of the activities I found out about, the deadline for registering for them had already passed. (1999)

Maybe you could send a student-wide e-mail to inform us of some of the activities. (1999)

They need to put things on the web site earlier than they had been doing. (1999)

Interns who offered advice also suggested more of the activities that they had enjoyed and also a greater variety of activities:

The tours are a lot of fun, and we should have more of them. (1998)

They were well planned, but I think it should be a little more diversified. (1998)

Need more. (1998)

More sports. (1999)

Interns suggested offering Student Association activities that could fit into their schedules, such as lunchtime get-togethers, or activities “on a smaller scale” that didn’t require an entire weekend or conflict with work:

NTS was awesome. More educational ones outside of work hours. (1999)

I would suggest a few more activities that are on a smaller scale for students that cannot get ‘gone’ for the weekend or miss work. (1999)

One intern suggested a meeting place be set up where students could gather:

I wish there was a meeting place for students to congregate and hang out after work. (1998)

Finally, as in the interview data, three interns suggested that funding for Student Association activities could be greater:

I would still like to see more of a variety of activities, more participants, and possibly a source of funding. (1998)

Maintain good leadership within this organization, and I think that it’s future will be bright. I sensed that availability of funds might be a problem for this organization. I’m sure funds spent on the SA would be put to good use. (1999)

Historically, SA activities have been poorly attended, but I think this is a reflection not of the activities themselves, but rather the fact that SA is provided very little in the way of resources to implement its activities. (1999)

Thus, although evaluations of the SGA social program contained in the two qualitative data sources were broadly positive, it appears that most interns who wrote or spoke on this issue actually made quite limited use of the social activities offered by the SGA. Regular participants in SGA activities (who were largely enthusiastic about them) were a distinctive subset that was more undergraduate than graduate, younger than older,

more white than non-white, more American than foreign, more “visiting” than local, more single than married, and more without than with children. Gender differences were illuminated in the non-comment part of the survey: women participated approximately 15 percent less often than did men. The issue for the SGA, therefore, in its community-building activities, is to effectively reach more interns through its web site and other advertising strategies, and to consider whether some of the least participating groups could (or could not) be attracted by an increased range of activities, for example, more family events, or events targeting graduate interns.

H. The Prestige and Reputation of LANL: Interns’ Perceptions of the Effects of Recent Security Problems and of the Los Alamos Fire

Because of concerns among LANL administrators about the possibility of damage to its reputation among current and potential interns caused by the publicity given to recent security problems, and to the Los Alamos fire, the interviewers were asked to explore this issue with the 2000 intern sample.

Security Issues

In 18 interviews (four graduate and 14 undergraduate) interns expressed the view that LANL’s reputation had been compromised by recent security problems. Conversely, in 12 interviews (three graduate and nine undergraduate), interns thought that LANL’s public image remained positive. In 16 interviews, (one graduate and 15 undergraduate) interns were of the opinion that the publicity given to recent security problems at LANL was not an issue for them and had not affected their work. Although these opinions were generally proportionate by race/ethnicity, sex, job category, and length of experience as an intern, it is notable that most of the opinions on this issue (whether positive or negative) were offered by undergraduates. Graduates were less likely to venture an opinion either way.

Some of the interns who thought that LANL’s public image has been adversely affected took the view that media misinformation was partly to blame:

I tend to see the public bad-mouthing us—that radiation is going to float into the water system and pollute it. But, where I train, even though I’m not really working with dangerous substances at all, they really want the lab employees to be aware of all the different hazards you could be exposed to, and what would happen if we let something get away. So, to me, what the media is portraying is totally wrong, because LANL does care. It’s not like the trees are glowing at night!

I don’t think LANL can improve their image. They’re already doing as much as possible, I think it’s more that the media will have to change their image...We need this place—we definitely depend on our technology to keep us on top.

The lab's taken beating after beating, even the New York Times on the 30th of July was saying, 'Enough is enough.' 'Cause we do the best job possible, and we don't ignore what other people have to say in criticism....It's really all hyped up because it's a national lab. It goes out of all proportion.

However, some interns took the view that LANL needs to be more pro-active in presenting the value of their work to the public and seeking their support:

The lab needs to take more advantage of programs or projects that shed good light on their image—like the new net project where the public has access to radiological data—things like that. They need to promote them more, instead of assuming that the public should just trust the lab. They need to earn that trust more, and I don't feel they are doing that.

Interns' comments contain both a sense of the provocation, criticism of LANL's work, and leg-pulling that they encounter in other life spheres, and of the loyalty to LANL that this evokes in them:

The publicity has affected us to some extent. You know, you don't go somewhere any more and say, 'I'm from LANL.' You don't say that any more! (laughing) You now say that you work for the government, and that's good enough.

People joke with me about it—but nothing really serious. In fact, I called my boss yesterday in Albuquerque to let him know what my situation was about going back to school. And he was just joking with me, he said, 'We trust you with the bombs,' (laughs). And I'm not even working with them. But nothing too bad.

It doesn't affect me too much because I really know what's going on, and I don't try to explain it to them [outsiders] because they're set in their ways of belief.

I think they really had a bad run of luck—everything happened just at the same time. And nobody bothers to look at the good stuff that's happening here.

I don't feel that it should affect the credibility of this entire facility, because a lot of great things have gone on here, and a lot of great people work here...People worked very hard to establish the reputation of this facility, and then, it only takes one person, one mistake, one little espionage incident, to just ruin everything. And that's sad.

Interns also commented on other effects of negative publicity about security that they had observed—notably on existing security procedures, and on the appeal of the internship program:

Well, our security's tightened up two-fold. God, we changed all the locks, all the passwords, and stuff we didn't have pass-worded, now we pass-word. Now we have to lock up everything, and close all of our doors. It's tough security. People lock their work stations when they walk away. It's just like more security, more training. Actually, it's a bit ridiculous.

You have to think about everything that you say. And it shouldn't be that way, because it's no different than talking to someone with an 'L' or an un-cleared status. But something in your head goes click. It's just that I'm afraid of what I might say. I've become very self-conscious.

Interns noted that the number and frequency of security check procedures had increased since the revelations of security problems. Security clearance was thought to take too long and prevented interns from doing necessary work until clearance was granted:

My experiment was supposed to take about a summer or a summer and a half. It's ending up taking me three summers. Not only that, I still don't know what my experiment is supposed to be because it's classified. This is the end of my second summer and I still don't have my clearance. Traditionally, the first summer, you don't have clearance because you're learning. The second summer you get your clearance, and the third summer you give your thesis. Well, I put in my clearance request at the normal time, right as the security incident happened. So, for the first six months, they said there would be no new security clearances. I put my request in promptly, but they said it would be one year—minimum.

Security meetings/stand-downs were seen as too numerous, and time consuming. They wasted valuable work time, disrupted the flow of work, and restricted communication between employees and departments. Six graduate students reported that their work had been significantly disrupted by these changes. Some computer use was also dependent on the level of clearance given, as also was access to those mentors who were "on the other side of the security fence."

Some interns registered anxiety about security protocols, and noted an increased level of frustration among regular staff. They were aware of co-workers' concerns that they were likely to lose more work autonomy should Congress impose further security guidelines

Interns reflected an impression gained from regular staff that they were seeing a decline in applications due to recent security problems that was especially noticeable with respect to international interns. The reasons were speculated to be the unwillingness of international interns to undergo the more extensive scrutiny required to achieve security clearance, plus the assumption that they would be less welcome at LANL than hitherto.

Six individual interns thought, however, that there were positive aspects to the tightening of security measures: that security procedures and training increased interns'

knowledge and awareness about the importance of the work done at LANL, and that special opportunities opened up for interns with security clearance.

Impact of the Los Alamos Fire

Negative assessments of the Los Alamos fire's impact were made in 29 interviews. In 45 individual observations, interns described the immediate effects of the fire on their work, housing, and/or personal life. Ten graduate students reported interruption of work on their projects as an immediate consequence of the fire:

The fire didn't affect my work, but the flooding danger immediately after did. 'Cause I work at [Building X] which is down the Los Alamos Canyon—which is in a severe flood hazard area now. So, all of the offices were moved up, but we don't have a lab yet, so we really haven't done what I came here to do this summer.

This summer, the fire really slowed things down a lot. I know with my group that it did. And the project I'm in got slowed down a lot—at least a month—and they're still trying to catch up.

Interns also discussed the after-effects of the fire in creating a sense of community displacement that had both physical and emotional dimensions:

There were a lot of fire victims—people were looking for somewhere to live. Housing was really limited. From what I've heard, it's pretty tight to begin with in the summer, and it's even more so now because of the fire.

Everybody's morale is a bit low just now...It was everything that happened at the same time—the fire, the security breach—all that kinda stressed people out.

As young people, they also noted a decrease in recreational options in a community that (as noted earlier in this report) were already seen as limited.

In 24 interviews, 36 individuals reported that the fire had made no significant impact on their work, housing, and/or personal life.

In two interviews (only), interns observed that LANL had responded positively to the fire: they noted an increase in safety awareness, and reported that LANL had provided monetary compensation to employees who had missed work due to the fire.

Apart from the graduate students who discussed how their work was or was not affected by the fire, overall, its impact was described largely in personal and community terms rather than in relation to LANL.

Interns' View of the Prestige of Working at LANL

In light of the negative publicity of which the year 2000 interns were aware, the interviewers also asked interns how they regarded the prestige of their internships. In 26 interviews, interns described LANL as a prestigious place to work regardless of recent events:

People get kind of envious when they hear you have a job here. Yeah, I feel a bit proud sometimes.

In 19 of these interviews (six graduate and 13 undergraduate) interns reported that they had been motivated to apply because of the prestige of working at LANL, and/or because a LANL internship would enhance their resumes. In four undergraduate interviews, interns saw working with prestigious LANL scientists as a good professional opportunity, and highlighted the career networking advantages of making these connections. It is (again) notable that more undergraduates than graduate interns responded to this question.

An issue related to LANL's reputation as assessed by its interns is the tacit organizational expectation that interns will become "ambassadors" who will support and enhance LANL's reputation in their present and future spheres of influence. Most interviewees showed little or no awareness of this expectation. In only five interviews (all with graduate students) interns indicated some understanding of, and willingness to meet, this expectation in return for the benefits of internship. In another 13 interviews, interns were either unaware of this expectation or did not see themselves as under an obligation to undertake this role.

I. Interns' Observations on Safety Training and on Safe Practice in Their Work Settings

Almost all of the qualitative information on interns' responses to safety issues was contained in the survey comment data. The limited amount of information that was contained in the interview data was reported in Chapter 4B information (in the context of all training and education issues). The two surveys asked somewhat different questions about safety. In 1998, written comments followed question 8A that asks, "Do you feel that you were given sufficient safety training to do your job in a safe manner?" In 1999, Question 8A was changed to: "Do you feel that the subject and practice of safety was taken seriously by your co-workers, managers and fellow employees?"

The 1998 question invoked 158 individual responses on 20 issues, of which over one-quarter (i.e., seven issues) were raised only once. The 1999 questions produced 124 individual responses on 17 issues, of which one-third (i.e., six issues) were raised only once.

Because the question on safety asked in the 1998 and 1999 surveys were different, the analysis of interns' responses was treated separately. It is interesting to note that that

the question posed in 1999 generated far fewer negative responses than that posed in 1998 (i.e., 1998: 26 negative observations vs. 92 positive observations; 1999: 67 negative observations vs. 69 positive observations).

1998 Survey Question on Safety Training

The most common individual comment (n=69; 51% of evaluative observations) was that safety training, or safety at LANL overall, was very good. These interns portrayed safety as an issue that is emphasized by the LANL staff, and felt themselves to be well-protected by the comprehensive and mandatory training they received in their work units before beginning new work:

Our group takes safety very seriously. I never felt that I was in any sort of danger.

There are numerous training courses that I was required to complete before I was allowed to perform specific types of work. This was all part of the safety effort here at the laboratory.

I was required to attend safety classes that were pertinent to my job. Safety meetings were held to discuss safety issues within the team.

Excellent training.

Much training. Very sufficient and well done

It is very thorough and complete

Safety issues were very strict, which is very good. I felt very safe after the courses that I took.

Very good! Excellent! I really appreciate the concern from everyone on the idea of a safe work environment. Safety is clearly stressed, and no 'ifs, ands, or buts' about it. I think it's a great idea! Thanks!

As the comments indicate, the emphasis on safety was new to many interns and they had learned to take it seriously themselves. Their responses echo the 96.8 percent of survey respondents who answered "Yes" when asked if they had been given sufficient safety training to do their job in a safe manner.

However, the write-in responses also included an almost equal number of caveats (n=67; 49% of evaluative observations) on safety training. Question 8A asks if the training received was sufficient "to do your job in a safe manner." Negative answers, therefore, largely focused on estimates of sufficiency. The most common complaints (n=36; 54%) were that: more training was given than was actually needed for the work that they did; they received repeat sessions on the same procedures; they were made to

feel incompetent in doing simple tasks; and they felt frustrated that unnecessary training took time away from work:

Too much safety and not enough productivity in the labs sometimes. Nobody trusts us not be to idiots.

There was far too much safety training that I didn't need. I was not permitted to do the stuff even after I was trained. So why do the training, and not use it?

I am not stupid. How many times do I have to hear the same lecture?

Way too much time wasted on safety training. The short group meeting that CST had together was far more valuable than all the required safety training and orientation meetings I went to.

Often overemphasized to the point of being a waste of time.

Some of these commentators were experienced interns who saw a radical shift in the training emphasis from a prior situation in which safety may have been under-emphasized:

I think the division has gone crazy with safety training. Not only is there a lot of safety training (which is sometimes worthwhile) but there is a mountain of paper work which has to be done.

EXCESSIVE!!! The safety policies seem to be on a pendulum here. Before the place was unsafe. Now so many ####?! rules and excessive regulations exist that no work can be done.

Among those offering caveats were 12 interns who questioned the relevance of blanket safety training. This group who worked in offices, as computer programmers or as theoreticians, reported that they had been required to take safety training that was not relevant to their jobs:

Safety training really did not apply to me because all I did was sit around in an office.

I received more than ample safety instruction considering that my job mainly centered around computer programming.

I work in an office most of the time so there aren't very many potential safety hazards.

My job does not require that I work with anything that has much chance of presenting a safety hazard.

Theoretical mathematics is a pretty safe field already.

Theoreticians don't have much to worry about.

I think that for the job that I was doing, the training I received was kind of irrelevant and sometimes over abundant.

The issues of training that did not fit the nature of the interns' work, or seemed excessive to interns, given their limited level of responsibility or area of work, was the only issue in either survey year that evoked joking answers (i.e., eight in 1998, and three in 1999). Responses such as, "Is it a safety hazard to spin around in your chair?" seem to be related to what a small number of interns perceived as a misfit between the amount and/or nature of safety training given and the nature of their work. As both the very high survey responses indicate, most interns appear to support LANL's emphasis on safety. Their main caveat is that training should be relevant to the work done.

1999 Survey Question on Employee Attitudes Toward Safety Practices

The 1999 survey question asked interns to assess how seriously coworkers, managers and other interns appeared to regard the practice of safety at LANL. Despite the variation between the two survey questions, interns' responses reflected a similar set of views, though the emphases were slightly different. Seventy-eight percent of the interns (n=92) who offered evaluative comments in response to this question wrote that:

- Safety was treated as a very important matter by their work group (n=46)
- Safety training and the resultant level of safety were excellent at LANL (n=25)
- They felt safe doing the work they were assigned (n=11)
- Their mentors and/or supervisors stressed safety (n=4)

Three other interns added that they followed the safety rules, that one intern who did not was removed from the work group, and that they had become more aware of safety since their last period at LANL:

Safety is a very important issue at LANL. I feel that safety and safety awareness is at the forefront of every employee at LANL. Safety is highly stressed at the work place and during new hire orientations.

One of the first subjects of my discussions with my mentor and my group leader was safety.

Safety is a big issue within my group. Supervisors are certain to explain the safety rules with every employee.

Safety was discussed clearly and often in our group. I always felt that it was important to my group members.

It is taken very seriously by my co-workers and managers.

Safety practices were considered in all experiments and occasionally reviewed.

My mentor was very serious on safety issues. I will not do anything in the lab without his approval, for safety purposes.

Managers were very good with safety. They made sure we could get in touch with them whenever we felt something was unsafe.

Safety is a very serious issue and has never, in my presence, been taken lightly. Everyone here has been safe and makes sure that I am being safe too. I would like to commend [X] on his safety awareness, not only with me, but everyone.

Two of these interns wrote about the consequences when safety practices were ignored:

We had a student that was not serious, but he was removed from our work group.

We take safety very seriously. In fact, since the accident in February, everyone has been scared to death of even ONE more infraction. We have followed every little line—not because of safety—but out of FEAR of the repercussions.

As with the responses to the 1998 survey, the primary criticism in the 1999 comments was that safety training was out of line with the risks of particular kinds of work, that valuable work time was lost, and that interns sometimes felt insulted by the level of the training given. These concerns were 22 percent (n=26) of all evaluative comments in answer to the 1999 survey, and the caveats raised mirror those of the 1998 survey:

I think most of it is overkill. Safety is mostly about ‘common sense.’

As usual, too much time wasted on safe work procedures.

So much that regular workers bitch about it.

People have to have ladder training to go on the roof. That says enough about how concerned everyone is with safety.

Overloaded!!

So much emphasis was placed on this that much of my short period here was spent in training.

I believe safety has been taken to an extreme. I think there is way too much safety overhead to get the job done.

Again, some of this group of interns (n=7) complained that the required safety training was irrelevant to the work they actually performed:

I don't think there are many dangers in this field, aside from carpal tunnel syndrome, and near-sightedness.

Not too applicable, since I work at a computer 99% of the time.

Totally irrelevant to my job.

Yet again (as is evident in some of the comments above), a few interns registered their view, in a joking way, that the emphasis on safety was, in some settings, over-done:

What can I say? The computer hasn't made any threats on my life so far.

Only three comments (for *both* years of the survey) mentioned areas where safety precautions were insufficient, or noted the negligence of other workers in following safety procedures. (One of these referred to the intern's experience in a previous position.):

Fire alarm procedures are inadequate.

Mentor was a poor example for safety. He even bitched me out once because I pointed something out to him about his personal safety.

Based on my experience at an EARLIER position (not in this division)...experienced lab people seldom follow the letter of the SOP in their work. The attitude seems to be that safety is the individual's responsibility.

The 1999 survey comments, as with those in 1998, underscore the strong numeric response in the 1999 survey (i.e., 95%) to Question 8A. In this year, the positive response supports the emphasis on safety observed among LANL co-workers. Indeed, the number of negative responses drops from 49 percent in 1998 to 22 percent in 1999. However, as noted at the outset, the focus of Question 8A shifts over these two years from the sufficiency of the safety training they had received for the work they were doing to evaluation of the level of safety they had observed in the practices of their work groups. Thus, more of the negative evaluations offered in 1998 address safety training issues—most importantly their work-specificity. Otherwise, caveats address the same set of issues in both years. This finding addresses a phenomenon well-known to qualitative evaluators—that, regardless of the precise wording of the question asked, respondents will say whatever they wish to say about the topic raised by the question. If the designers of the survey want feedback both on safety training (including its perceived relevance to the work being done), and on the level of safety practice observed in the interns' work settings, they might consider asking about both of these—as separate questions.

J. The Intention to Apply for Further LANL Internships

In the interviews, interns were asked if they would like to return to LANL for another internship. In the 25 focus groups in which interns offered a “yes,” “no,” or “maybe” answer, 17 included affirmatives, seven included negatives, and a further 12 included “maybe” responses.

Clear intentions to return were almost exclusively offered in undergraduate interviews (16 out of 17). They were also offered in more interviews with men than with women (i.e., in 12 male and five female groups), and in a higher proportion of interviews with students of color (11 of 33 interviews) than with white students (six of 14 interviews). Undergraduate interns of color intending to return were: four of 15 Hispanics, one of eight Asians, two of six African-Americans, and four of four Native Americans.

Some of the reasons offered for both “yes” and “no” answers were related to the educational or career-related aspects of the experience. In four interviews, undergraduate interns cited interest in the work and the prospect of learning more as reasons to return:

If I come back, then I’m sure it’s going to be different, but also very similar. I was doing a lot of programming, but that’s done now, so I’ll probably do more experimental things—which would be nice.

However, the reasons given by most of the undergraduates intending to return focused on the internship as a summer work option. Undergraduates in eight interviews described the benefits of returning as building on what they had learned during their first internship, and in 10 interviews, interns highlighted their expectation of a raise and/or a promotion if they returned:

When you get into the groove the next year you come back, you get a lot more out of it because you have experienced what’s expected and what you can do. I think that would be the best thing about coming back—just to be able to pick up where you left off, instead of starting from scratch.

Once they know your work, I think that you are going to start at a higher salary, and you could get a more responsible job in your division. Being known here counts for a lot.

In seven interviews, (three of which were with graduates), interns were interested in returning because they appreciated the flexible hours that allowed them to balance their work at LANL with school (during the semester) and/or family responsibilities. In six interviews (five with undergraduates, and two with strong agreement across the group) interns rated their internships as better than the employment (or internship) opportunities offered elsewhere. Other pragmatic reasons offered were “being local,” and the value of the EIP program.

“Being local” was also offered as a reason not to return, but to seek different work experiences elsewhere. Personal reasons unrelated to the internship—getting married, or other expected life plan changes—were also offered. The experience of a poor fit between the work of the internship and the intern’s career goals was mentioned in only one undergraduate group.

Uncertainty about returning was more clearly the response of undergraduates who were carefully weighing their career options. It was influenced by the prospect of another internship that might offer a better fit with career goals (in six undergraduate focus groups), or by entry to a new school or course of study (including acceptance into a particular graduate school) that might shape the intern’s career direction. In two focus groups, interns cited the “the amount of red tape” involved in arranging a return as the deciding factor. The desire for new and different experiences was also expected to guide the decision.

The 12 undergraduate focus groups in which interns discussed the reasons for their uncertainty about returning for a further LANL internship were: three of 14 whites, two of 15 Hispanics, four of eight Asians, two of six African-Americans, eight of 23 ‘novices,’ and four of 24 ‘veteran’ interns.

In seven interviews (four graduate and three undergraduate) interns said either they would not return, or that they were unlikely to do so, because the internship had not met their educational and career goal needs. Five of these groups were composed of Hispanic interns. Hispanic interns were, thus, divided on their levels of satisfaction and their intention to return. Five of the seven interviews were with interns who had been at LANL for more than one period.

In the survey comments data, interns spontaneously mentioned their intention (or disinclination) to return to LANL for future internships: 26 individuals expressed interest in a career at LANL, while only three said they did not want a career at LANL; eight interns voiced strong interest in returning for another internship; three wanted to return to do work on their thesis; and one intern wanted to return to LANL to do more research work. Two interns commented that they were not interested in returning to LANL for future internship work.

6. Interns' Perceptions of Issues Related to Gender

Information on gender issues (and also on race/ethnicity) was provided largely by interview data, augmented by a limited amount of survey information.

The sex balance of the 1999 interns reflected in the survey data was 43.2 percent female, 56.1 percent male (and 0.7% where sex was unrecorded). In the interviews, both men of color and women of all races/ethnicities were slightly, but intentionally, over-sampled in order to clarify issues that can become lost where the numbers of any group are disproportionately small. The resultant sex balance for interviewees was, thus, 53.6 percent female and 46.4 percent male. In keeping with our experience that interviewees feel more comfortable in discussing gender and race/ethnicity issues in focus groups in which only members of that group are present, all focus groups were composed of the same sex and the same race/ethnicity. (The composition of the sample by sex is described in Chapter 3A, cf. Appendix C, also)

In all interviews, interns were asked for their observations on any gender issue that they had observed or experienced at LANL. Individuals in 12 interviews with women and in 11 interviews with men reported that they were unaware of any gender-related problems. In nine interviews, returning interns thought improvements had been made in the balance of employment between men and women and/or in the climate for women employees. Notwithstanding these more positive assessments, gender-related problems were discussed in almost half of all interviews (21 of 47).

Balance between the Sexes in Employment Distribution

Five graduate groups commented on what returning interns described as improvements in the employment balance between men and women. In two interviews with men, interns noted a higher number of women employees than in previous years. In two female, and one male, focus group interviews, interns had noticed more women occupying leadership roles than in their previous experiences at LANL. However, in 10 interviews with women, and five with men, interns felt that LANL still employed too few women. They drew on their experience of other work contexts to point to what they saw as an unusually low proportion of women to men:

One thing that really surprised me when I got here was the men-to-women ratio—I think the ratio is seven to one in my group...I don't think they did it on purpose because they just wanted more men—but it really surprised me.

You don't see a whole lot of women. If you go to a lot of meetings, you will see old bald men with glasses. It's like I've seen more of these here than anywhere else I've been.

In three women's focus groups, interns thought there were still not enough women in leadership positions:

In the division that I work in there's only one woman that's a group leader—out of twelve groups. You just don't see a lot of women here. In fact, you don't see a lot of women regardless of where you go.

I thought, being here, they would have had more women scientists. But you go into electrical, and physics, and you just don't see it.

The top level scientists—yeah, more male than female.

In three more interviews (two male and one female) interns commented that the gender balance varied considerably by department and division, and in one male focus group, interns noted that the majority of both female workers and female interns were working in administrative or other support capacities:

The lab sent out an e-mail the other day on their diversity program. I looked at their web-page, and they're bragging that they have women on staff here. But, when you look around, the support staff is probably 95 percent women. I don't know what they're bragging about. I mean, I think that's awful.

The interns who described this imbalance portray LANL as an organization that has become out of touch with the increasingly gender-balanced world to which the interns are accustomed:

I'm an engineering student, and I'm used to being a little bit lonely. But it's worse than school here! (all laugh). At school, you see female professors and fellow female students, but not here—it's not true at all here.

We have such a lack of women in science here. And that's going to be really important stuff. If you don't have the women in these areas, we're losing a great resource.

The problem this creates for the internship program is that it models a world of science and technology that interns see as dated, and in which it is harder for female than for male interns to be allocated work appropriate to their interests and experience.

The Climate for Women

The climate for women was also seen as improved by some returning interns, due, in part, to the introduction of diversity training (discussed in one female and one male interview). In two interviews, women reported that communication between men and women was generally good in their departments. Members of a male graduate focus group described female LANL employees as more approachable and pleasant than the men, particularly in a climate that they saw as encouraging men to exhibit what they described as “ego problems”:

What I notice are the women scientists are more friendly than the men...They are more down-to-earth, easy to talk to. You try to have a normal conversation—just an everyday conversation—with the men and they turn scientific right away.

Notwithstanding some perceived improvements in the climate in which women at LANL work, graduate interns especially noted some persistent problems:

I think there's definite gender issues...I see it all the time in the ways women are addressed, and in the way they are treated when they are giving a presentation, versus the way a man is. My supervisor gave a talk the other day—she's a geologist. And so we're neutron-scattering, and most people in that field tend to be physicists. And it was unbelievable. She couldn't say two words without someone interrupting her. They didn't know what she was talking about because they're not geologists, but they were still jumping on her every two minutes...That was in our building among all the people we work with. It was pretty amazing. And we talked about it afterwards, and she recognized what was happening.

It depends where you're going to work...'Cause you get into one of these more old-school groups where you have all these old codgers firing away at their desks and, yeah, you're going to have a real hard time there.

A lot of the older mechanical engineers who have been here a long time, they're just not used to working with young professional women, and the way they behave, that bothers me.

Older staff that are very set in their ways, unless they respect you, they won't listen to you. And it's very hard to get them to respect you (laughing) 'cause they won't listen to you!

In two male, and one female, interviews, interns described the quality of communication between the men and women as poor in their departments. Three focus groups (two female and one male) reported little support for women employees:

They need more women here! ...It would help things. It supports you a little—tells you that you are headed in the right direction.

It gets kind of frustrating when you don't know if he is listening to you...And you are wondering if it's because you're a woman...A lot of times, he and the male student would go off someplace, and I wasn't really asked any questions or asked my opinion on anything, and that was frustrating.

I thought, I can't stay here...I'm not learning anything, you know. I'm just doing all the dirt jobs, and that's not what I'm here for. And I wanted out because he made me totally uncomfortable. And nobody helped me. I e-mailed messages to a lot of people, but there were no mentors open, and the only option was to wait

for summer. And I'm thinking, 'No, you don't understand. I need help right now.'

In two women's interviews, interns assessed the LANL climate as especially non-supportive of those women who were balancing work with parenthood. Most concerns about the climate for women were expressed by graduate interns; in two female undergraduate interviews, the interns reported that they had heard about incidents of gender bias at LANL, but had not directly observed or experienced this.

Sexual Harassment

One female intern (only) in the interview sample reported an experience of sexual harassment—an incident that LANL has also documented and formally responded to:

I had a really hard time with him, and felt that nobody was helping me to find a new mentor. I went to the team leader, and she supported this guy 100 percent, so I thought, 'Maybe I'm wrong.' And it took like six months—a really long time—and I thought, 'I don't need to be treated like this.' Then, in a communication workshop, I was talking to this lady from HR, and she said I had to report his behavior. So I went and filed a report and two weeks later, he was gone. But she was right. I didn't have to take that so long.

The view of other women who described hearing about instances of sexual harassment at LANL was that this problem should not arise at all:

There's been like a tiny number of instances of sexual harassment—but we don't want to have any.

Perception and Interpretation of Gender Issues

In four interviews, the interns referenced gender-related issues that they had noticed, but did not define as "problems." One undergraduate male explained the lower number of women employees in terms of their failure to apply; in two graduate interviews, women saw the imbalance as creating good hiring opportunities for women. In discussing the climate, the women in one focus group reported that a culture of "joking" behavior between the sexes is common, but assured the interviewers that they were not offended by it. One male undergraduate reported that he is careful when talking to women at LANL because he fears being accused of sexual harassment; a second described this fear as giving women an unfair advantage—because they do not have to worry about such charges. Observations such as these cannot be taken as indications of "no problem." They may, more accurately, be viewed as manifestations (that are well-documented in the relevant literature) of the ways in which both men and women cope with problems that they would prefer to avoid, deny, or discount:

I've seen a lot of men on their tip-toes around the women. I've definitely seen that with the management because they want to be careful to stay away from that sexual harassment suit—no friendships; just being total professionals.

There's an issue with the administrative group that is composed mostly of women. Well, you don't feel comfortable going in there—whereas if this wasn't an issue here, you could go in there normally and freely. Now you really have to pay close attention.

As might have been predicted, more women than men observed or experienced gender-related problems. However, it is important to note how many young men—especially graduate interns—expressed awareness of under-representation of women at LANL and of aspects of its climate that are discouraging to their female colleagues.¹ The reporting of gender issues was also more marked among interns in science and technical departments: interns in half of the interviews with those in science and technical positions (18 out of 35) represented in the interview sample described gender-related problems compared with only one quarter of the groups containing interns in office/administrative positions (three out of 12).

Although, in the views of some returning interns, LANL had made improvements to the climate for female staff and interns through its diversity training program, half of the interns had observed or experienced gender problems—with work distribution, work climate, and—in a few instances—with situations that were perceived to be open to interpretations of sexual harassment. They found the attitudes and behavior of many male workers to be out of touch with the more egalitarian and gender-neutral worlds of education, work, and social life to which they were accustomed.

¹ We note in other current work—both our own, and that of colleagues in this field⁽⁴⁸⁾—a trend to increasing awareness of gender bias and the cultural impediments to women's achievement among young male professionals in the sciences. Male graduate students and young male faculty who are engaged in working out the ramifications of dual-career relationships, and who participate highly in child-rearing, express (and comment upon) a greater awareness of the structural and cultural impediments to equality of achievement opportunities within science and engineering than their senior male colleagues who have more traditional gender-segregated family role relationships.

7. Interns' Perceptions of Issues Related to Race/Ethnicity

All interviewees were asked whether they had experienced, or observed, any problems related to race/ethnicity. Interns in thirty-nine of the 47 focus groups responded to this question, of whom:

- In 20 of the interviews (12 composed entirely of interns of color, and eight containing only white interns), none of the interns had noticed any discrimination or racist behavior in their immediate work environment, in the internship program, or at LANL in general
- In 19 interviews (14 composed entirely of students of color and five containing only white interns), one or more of the interns had experienced or observed particular race/ethnicity problems. In seven of these interviews (five of color and two all-white) interns described instances of discriminative or racist behavior (towards themselves or others) at LANL; these were not contested, or interpreted in alternative ways, by other group members. Interns in the remaining 12 focus groups (nine of color and two all-white) interns had observed no overt discrimination or racist behavior, but did comment on the under-representation of non-white employees and interns in some areas of work, and/or at some administrative levels.

In addition, we note that 94 (7.6%) of the 1,234 respondents to the 2000 survey neglected or declined to answer the demographic question requesting an indication of their race/ethnicity. Specific objection to this question was expressed in the survey write-in comments by one student who interpreted it as an indication that LANL is using race/ethnicity as a factor in their selection of interns or in their regular hiring practices.

In the interviews, undergraduates appeared slightly more likely to report racial/ethnic problems than graduates: interns in 18 out of the 26 undergraduates, compared with 12 of the 21 graduate interns, responded to this interview question, but there were no differences in the responses by sex, extent of LANL experience, or type of work. However, interns of color noticed more overt discrimination or racist behavior and also more under-representation in areas of employment than did white interns. The problems identified by both white interns and interns of color were of three types:

- Mal-distribution of employment in particular work roles by race/ethnicity
- Prejudice or discrimination expressed towards particular groups
- An uncomfortable work climate, generally, or in some work units, for interns of color

Mal-distribution of Employment

Some interns observed that people of color were under-represented among LANL employees overall, and that employees of particular racial/ethnic groups were concentrated in particular types of work. The same pattern was also noted among the interns: students of color were seen to be fewer overall:

We don't have a lot of Hispanics in the lab. We have younger, undergraduate students, but when it gets into graduate students, that number shifts radically. At the Sustainability Conference, Mike Trujillo, who is with the Equal Opportunity office here at the lab, gave

us the numbers. At the undergraduate level, there's something like 37 percent Hispanic, and at the graduate level, it drops to 10 percent.

Most of the lab managers are Caucasian people. And you would expect there to be a difference here—the Hispanic population that lives around this area are the majority, so you would think that the jobs would reflect that.

Speaker #1 Probably out of 35 people in this section, there's only two Caucasian people—the rest are Hispanics.

Speaker #2: That's true where I work also.

Speaker #1: Like all the electrical and plumbing and road repairs here—they do everything—they are all Hispanic.

Speaker #2: My division is the bus division and there's a lot of Hispanics there too.

At least in our field, everyone is pretty much white. I have a Hispanic background, but you wouldn't know it by looking at me, so it doesn't come up for me very often in terms of being treated differently. But all the administrative people, the janitors, and the maintenance people are pretty much minorities. I think, being in New Mexico and not having any scientists coming from the surrounding communities is very weird—it's very odd that no one seems to recognize or address that.

Interns of color, as well as LANL support staff, were also seen to be under-represented in science and technology roles, and were over-represented in office/administrative roles:

I wish I had known earlier that this place isn't as diverse as I thought it would be...To go from an environment like I grew up in and to come here—it's just been very, very difficult for me...It helps to have more people around that look like me because then I don't feel so out of place...You know, we make up 14 percent of the population, and we pay taxes for what goes on here at the lab. And I just think that if there's 1,500 students, at least 150 should be African American. And there's not!

These observations are supported by year 2000 survey data that also highlight the over-representation of white interns (relative to their overall numbers) and under-representation of Hispanic interns in science and technical positions. By contrast, Hispanic interns (especially) are over-represented and white interns are under-represented in office/administrative positions.¹ As noted in Chapter 5 (on LANL's entry processes), interns of color speculated that recruitment of interns of color into science and technology positions was not currently proactive and may have been cut back:

Dr. [X] had an HBCU program here at the lab in which she visited different universities and recruited African-American students. She often came to my university. But the funding for her program has been cut, so I don't know if she is going to be able to

¹ There were no data available to the researchers that would clarify the causes of this work distribution. It may, perhaps, reflect a history of drawing office/administrative employees from the population local to Los Alamos, while recruiting nation-wide for scientific and technical employees. Findings from the interview data would, however, seem to warrant investigation.

continue doing that. That's definitely a concern that I have. It doesn't affect my position, but African-Americans are not well represented here at the lab.

Dr. [X] is not getting any more funding for that program and no one could answer my question at the conference about why that is...They say they are trying to maintain a diverse environment here, but it's not the truth...When you have diversity, you need to represent all ethnicities...I can't speak for the other groups, but I'm African-American and they don't have a lot of African-American full-time employees here, and they don't bring in African-American students either. That says something real about their diversity policy.

Others concerned about minority recruitment, questioned the practice of recruiting at either HBCUs or at the "big name" schools. This leaves out institutions where most students of color are actually to be found:

They were talking about going to schools like MIT, Stanford, and Berkeley to recruit, but what about students like myself who were accepted to big name schools, but didn't have enough money to go there, and then pay for medical school after? I went where I could go for free, but it doesn't mean I'm not as intelligent as someone at the elite schools. So I don't think it's right to recruit just there.

Interns wondered if the LANL administration had also noted this aspect of their internship program, and whether they were concerned about it:

They don't really have anyone pushing them anymore to recruit people of color, so the problem's just going to stand. And I don't really think that they care.

Prejudice or Discrimination Expressed Towards Particular Groups

In five graduate and five undergraduate interviews, interns had noticed that international interns (particularly Asians) were treated by LANL staff (and some interns) as if they represented a security risk:

When this whole Lee thing went through last year, a lot of the Asian people suffered. Somebody wrote, 'I spy' on an Asian kid's locker.

There's a downside right now. The Asian community feels like there's an invasion of privacy, depending on what type of work you are doing.

I knew a girl from India who really had to go through a lot of horrible stuff. I mean, we, in general—the foreign students have put up with a lot of things in the past. But the last year and a half, it's been very bad. She had so much trouble from people—just to get anything done, she was really given a difficult time. I don't know how much, you know, but there's been a lot of bad things going on.

When I applied, there were a lot of changes in the security, and they said I was not allowed to have access to the insurance. And I don't have access to the Internet or e-mail—well, I have at home, but not through the lab.

The foreign nationals have to get permission to go to certain areas—like the Student Association had a tour of the divisions, and the foreign nationals couldn't go on the first tour, and they had to get written permission for the second one.

I am a foreigner and I don't have access to most of the facilities. I can't even use the bathroom when I am in the building. Of course, that's not because of my race or anything—that's applied to all foreigners...It affects the work because I don't have easy access to the places that I need to go. Eventually, we can arrange permission, and I can go escorted. But everything takes more time, and I always have to call someone who has to be with me at all times to do certain things. I feel so bad, because that person might not be interested in what I'm doing. So it's difficult, difficult.

In related comments in the 1999 survey, concern was expressed that LANL seemed about to withdraw its invitation to foreign nationals to apply for internships. One international intern hoped that this would not happen; several others reported that foreign nationals were excluded from some amenities that were open to other interns:

My experience at the ACL was invaluable. I learned a great deal and thoroughly enjoyed my time here. I am grateful that LANL supports the GRA program and I hope that LANL will continue to allow foreign national students to participate in this program. (1999)

[It] would be nice if foreign nationals were not excluded from some activities. (1999)

In the interview data, one non-foreign minority intern who, by virtue of his appearance, had also encountered treatment as someone who might be a security risk:

In some places, people don't talk to you—they kind of want to avoid you. It's not major over here—I think they're used to a diverse group of people in my unit. In my job—the group here—they don't do that to you at all. It's like in the other places I go to—they check my badge every time—to make sure I'm not running off with the coffee maker or something (laughing). Yeah, I have to show my badge everywhere, even when they know me. It's just another thing that really bothers me.

The Work Climate

Two undergraduates noted social avoidance in some divisions or work groups, or lack of communication across racial/ethnic lines, as described in this exchange:

Speaker #1: Sometimes people treat you like you're incompetent just because you're from my community. They look at you funny sometimes, or they won't ask you for help.

Speaker #2: Yeah. Some of it is because you are a student—students are kind of blown off anyway. But there's also certain individuals that you get a funny feeling that, 'Maybe I shouldn't be asking him'—because it feels awkward. I just try not to deal with people I don't feel comfortable with.

Speaker #1: What I try to do is to kill them with kindness—I try to say 'Hi' to everyone when I'm walking, even if I don't know where they work. But, everyone has to deal with this suspicious climate—even permanent people.

In two further undergraduate interviews, interns discussed the tensions that arise intermittently between Hispanic and non-Hispanic interns. Their basis appears to be the sense of exclusion experienced by white students (who are accustomed to being part of a majority) when transposed into a work or residential setting in which Spanish-speaking people are the majority.

Speaker #1: Well, it's not really tension, I mean, I get along with them. But, like yesterday, we had a little party and they were continuously talking in Spanish. I don't speak Spanish and so I asked them to stop 'cause it was driving me crazy. And then they started translating. I mean, it isn't like we'd kill each other, or anything that extreme, but they have their cliques.

Speaker #2: Yeah, that's a good word. They have their own groups that they stay with. So, when you're new, it's hard.

Speaker # 1: A lot of them come from Espanola—and that's like all Hispanic. I don't know that there's any white people down there. I won't ever go there. It's scary and you're not welcome

Speaker #2: And the guys like the blondes, but the girls hate them.

Speaker #1: I won't go there either. It's dangerous.

Speaker #2: Yeah, for the most part, I stay clear of them.

Stereotypical perceptions, and the tensions they create, can be predicted when interns from around the country are brought into LANL's tri-cultural context. Such perceptions can usefully be addressed in diversity training programs.

Reports of differential treatment of non-white individuals in the interview data were small in number. However, the data on racial/ethnic issues was very limited, and cannot be used to gauge the extent of actual difficulties in the cultural climate. However, all reports of prejudice or discrimination expressed towards individuals or whole groups, and of inter-group hostilities or tensions, merit attention.

The most evident race/ethnicity problem for the program, therefore, would seem to be whether and how the mal-distribution of internships between majority and minority groups can be addressed. The under-representation of Hispanic scientists, engineers, and technical experts of color in the regular LANL workforce is part of a wider national problem of under-representation of non-white/non-Asian professionals in these disciplines. Internship programs are often seen as one means by which such imbalances might be addressed.² It is important, therefore, not to unwittingly perpetuate the problem within such programs.

² The promotion and retention of students of color in SMET degrees by encouraging their participation in undergraduate research opportunities is cited in the literature on this subject.^(1,2)

8. Summary of Findings and Recommendations for Ongoing Program Evaluation

The conclusions from these data analyses are presented largely in the order in which aspects of the internship program are discussed in the report. However, the summary also includes issues that cut across topics.

Influence of Internship Experiences on Interns' Career Plans and Goals (Chapter 4A)

The qualitative data analyses were able to clarify the ambiguous finding of a “yes” answer by 70 percent to 72 percent of the survey respondents (across both survey years combined) to Survey Question 7 that asked, “Has this experience had any influence on your career plans or goals?” Both the interview and survey comments data address the direction and nature of the internship’s impact on the career aspirations and goals of interns.

Taking the two years together, 88.2 percent of the individual evaluative observations in the survey comment data referenced the positive impact of the internship experience in helping interns to choose, refine, clarify, or reconsider their career direction and goals. There was no difference between the two years of survey comments in this regard.

The survey comments data also offer insights into how the internship experiences increase awareness of career options and shape interns’ career directions and/or decisions. This is important information because there is almost no documentation of these processes and their relationship outcomes in the relevant research and evaluation literature.

For the smaller number of interns who did not report career-related benefits from their internship experience, the main source of the problems was failure to match interns (by educational focus and career interests) with relevant work positions.

Other reported benefits of the internship included increases in self-confidence, ability to communicate and work with others, and enhanced understanding of professional work in a range of science and technical fields.

The interview data offer some caveats to this strong positive finding:

- Some graduate interns who were expecting to generate a thesis topic on the basis of their internship were disappointed
- Satisfaction with the internship in terms of its impact on career direction was stronger among white than non-white interviewees. In interviews, Hispanic interns expressed the least satisfaction with this aspect of the program.
- Support for interns’ educational interests and goals is less clear than help in shaping their career directions

The interview data also indicate two other areas of benefit to interns:

- Generation of a desire among some graduates and undergraduates for a career at LANL
- Development of professional relationships and career contacts

Internship as an Educational Experience Versus Internship as a Work Experience (Chapter 4B)

Interns' survey comments portrayed the internships primarily as a work experience in which they learned things that were intrinsically interesting and/or that could be used in future work settings rather than as an educational experience *per se*. This distinguishes the LANL internships from undergraduate research experiences in colleges and universities. Nearly four times the number of positive statements (n=830) and three times the number of negative statements (n=64) in the survey text data were used to evaluate the internship as a work experience than to evaluate it as an educational experience (i.e., 161 positive, and 60 negative, evaluative statements).

These observations are also reflected both in the survey questions which address the issue of interns' academic gains very obliquely. Question *xi*, that asks whether the main focus of the intern's work supported their thesis, attracted a large 'not applicable' response (65%), particularly from undergraduates, a 20 percent negative response, and an (un-illuminating) 15 percent positive response. Question 2 (which asks interns to rate the applicability of the internship experience to their academic field of study) again attracted a 20 percent 'not applicable' response. In a statistically significant finding, graduates who answered the question, scored it highly (1.75 in 1998 and 1.60 in 1999); undergraduates less so (2.20 in 19998 and 2.09 in 1999). Thus, the survey questions exploring the internship as a learning experience are too narrow to discover much about the educational gains of the internships, particularly for undergraduates.

Interns' positive assessments of their experience in the survey comments were often linked to the opportunity to learn. However, the types of learning that they described were more often related to work than to education. In addition to helping develop a career direction, interns clarified what contributed to 'good' work experiences, and the learning embedded in these:

- Work that was personally "challenging"
- Work situations in which the interns had some control over the type of work they did
- Work that was "meaningful" because of its potential to "contribute to science"
- Work that offered a variety of job tasks and learning opportunities
- Work that offered the opportunity to acquire new skills (computer skills were the most commonly-mentioned)

Gains in skills were portrayed as practical benefits that would be useful in future employment and make interns more attractive to prospective employers.

When offering negative evaluations of their work as interns, the respondents characterized poor work experiences as:

- Working in positions that were unrelated to their education or career interests
- Performing boring, repetitious, and non-challenging “busy work”
- Feeling useless because they had insufficient or no work to do

Internships were reported to give greatest work satisfaction where interns saw some connection between their work and their broad educational and career goals, when they were given the opportunity to learn something new, and when the utility of their work to the department or project was clear. Unlike undergraduate research programs to which these internships may be compared, the survey comments do not indicate that most interns made educational gains, such as understanding the nature of “science” and the research process, or the theoretical underpinnings of their work.

The interview data both mirror, and amplify, the findings from the survey comments data. In 25 of the interviews (including 52 individual responses) interns gave positive assessments of the value of the work they were doing and the level of interest that it held for them. Satisfaction with their work was expressed in terms of:

- Valuing what they did: feeling that their work contributed to important outcomes gave their internship a sense of purpose
- Appreciation of encouragement to explore their own ideas and to make suggestions that could shape the direction of the work
- The sense of doing real science in a professional environment

Positive evaluations of the nature and utility of their work were more strongly represented in undergraduate interviews: they were offered in two-thirds (17 of 26) of the undergraduate interviews compared with only one-third (eight out of 21) of the graduate interviews. Interns who expressed satisfaction with their work described work situations in which interns:

- Were productively occupied, and had plenty to do and learn
- Were encouraged (by mentors and co-workers) to work independently, use their initiative, be assertive, and take responsibility for the quality of their work

Eight of these interviews were with undergraduates in science and technical positions and only two with those in office/administrative roles.

Over one-third of all interviews (18 out of 43) contained 36 comments that specifically addressed problems with the volume and pace of their work. These interns (largely undergraduate) reported a highly uneven flow of work in which they were either very busy or had nothing to do. They questioned the value of their work and often felt bored and direction-less. In seven undergraduate interviews, interns defined their work as unchallenging, repetitious, and/or unnecessary. Also in seven interviews, interns had

found the length of the internship too short to get an authentic experience of hands-on science, to complete the projects on which they were working, or to feel that they had contributed anything of value.

“Learning” as a positive aspect of the internship was mentioned in almost all of the interviews (i.e., 38 of 47), particularly among undergraduate interns (22 out of 26, compared with six out of 21 in the graduate interviews). However, as in the survey comments analysis, the types of learning described are work-related rather than educational gains. Much of the learning cited was linked to practical objectives—awareness of the value of new knowledge and skills in a changing job market, and an expanding awareness of what career alternatives were available. Again, computer skills were the most frequently mentioned gain, but social, professional, and research skills were also cited.

Some interviewees reported that the internships tended to promote independent learning. These interns had been required to undertake some responsibility for work completion and quality, to show initiative, and to be assertive in asking for what they needed to get the work done. Reports of growth in independent learning were evenly distributed among undergraduate and graduate interviews, and by race/ethnicity, sex, and length of experience. However, far more interns in science and technical positions (18 of 19 interviews) than those in office and administrative work (1 of 19 interviews) reported that they had learned to work independently as part of their internship experience.

Negative evaluations of formal learning sessions were offered in 21 out of the 47 interviews (seven of 21 graduate and 14 of 26 undergraduate interviews). Negative statements about learning clustered around four main issues.

- *Training* (an issue for undergraduate interns only): too much information for absorption, insufficiently relevant to particular areas of work, poorly communicated, and/or took too long
- *Orientation*: presentations were faulted for inconsistency between sessions, unnecessary information/belaboring points, but lacking depth on some issues important to interns
- *Procedures/Stand-downs*: (including safety and security procedures) were seen as unhelpful learning experiences when they were defined as unrelated to actual work or unnecessarily interrupting the work-flow. (Safety training and the observed level of safe practice are discussed more fully in the findings from Chapters 5I and 5H)
- *Work roles that contained no learning opportunities*: work that was defined as “just a job”

Interns’ Evaluations of the Contribution of Mentors and Student Advisors to their Internship Experiences (Chapter 4C)

Mentors: The interns’ overall assessment of the mentoring they had received was, by all indicators, positive. The write-in comments yielded 290 positive (82%) and 64 negative

(18%) assessments across both survey years. Positive individual statements about aspects of interns' working relationships with their mentors were also offered in 44 out of the 47 interviews.

The interns' evaluative observations on the contribution made by their mentors to their internship experience focus on two facets of the mentors' role:

- **Formal Role:** How well mentors fulfilled their formal duties to their interns—the level and nature of access, communication, direction, and support for educational and career goals experienced.
- **Informal Role:** How the quality of the personal and professional relationship between interns and their mentors affect the interns' evaluation of their overall experience.

This distinction is also reflected in the responses to (ordinal) survey Questions 3 and 4a that asked students to evaluate their mentors. The means for both questions reflect a positive student evaluation of their access to, and quality of relationship with, their mentors. Question 3 returned means of 1.59 and 1.56 for 1998 and 1999, respectively. Question 4a scored a mean of 1.77 in 1998 and 1.71 in 1999; the bar charts in Appendix B show the strength of these positive scores. Tabulating these questions by program did not produce any sizeable changes in the means.

In 37 (of the 47) interviews, interns reported that communication with their mentors was working well, and in 29 interviews, interns reported good access to their mentors—including daily physical or e-mail contact. 'Good' communication was defined as comfortable, two-way, open, and collegial. Collegial treatment by people with superior education and experience made a strong, positive impression on those interns who experienced it, and bolstered their confidence. Interns also expected mentors to take an active interest in their educational and career goals—helping them to develop thesis topics, or enabling other aspects of their education or career planning.

In 212 individual survey observations (i.e., among the most frequent comments in these data sets) described the characteristics of mentors who performed their roles well. As defined in interns' accounts, 'good' mentors contributed to good work experiences by:

- being accessible—physically and/or by e-mail
- providing clear explanations and expectations of the interns' work
- giving guidance as interns learned new work skills
- supporting and extending interns' learning (including helping to develop their Education Work Plan) and helping with their career planning
- being collegial, willing to answer questions, and enjoyable to work with
- giving interns an appropriate measure of freedom to develop their work
- taking a personal interest in their proteges

'Poor' mentors were also defined in terms of insufficiencies in all of these qualities. However, the primary unmet needs described by interns were irregular access

to their mentors, and insufficient guidance, such that interns did not know what they should do (or why). The interview data suggest that problems with mentors were either more likely to occur with (or were simply more critical for) interns in science and technical positions than for those in office or administrative roles. There were also slightly more problems with mentors reported by interns of color.

Interns thought that a partial cause for these problems was insufficient preparation for the mentoring role. This may be considered an irony, given the frequent complaint of undergraduate interns especially that LANL ‘over-trains’ for other aspects of the internship.

Student Advisors: Question 14a (rating the interaction/availability of Student Advisors) produced a more negative assessment than the two questions on the interns’ relationships with their mentors. Indeed, it was one of the lowest-scoring questions in the survey data. The mean for 1998 was 2.51, which remained virtually unchanged when tabulated by program.

In the survey comment data, also, student advisors were far less well used and appreciated than mentors. Over the two survey years, interns offered 91 positive observations and 101 negative observations. Positive evaluations are almost identical over the two years, but negative evaluations drop from 65 in 1998 to 36 in 1999. In half (52%) of the negative responses, interns wrote that they were unaware they had a student advisor, had not been assigned one, and did not know what their role might be. Interns thought that some departments were better than others in providing student advisors and linking them with interns. The other half of the negative observations described the limited nature and poor quality of their interactions with their student advisors. In a small number (n=23) of neutral observations, interns explained that they felt no need of a student advisor’s help because their mentors and co-workers met their needs by providing information and/or assistance. By contrast, those 37 percent of comment writers who had interacted with their student advisors described them as a useful source of information and personal support.

In order to be useful, the student advising system needs to be in place in every department and for every intern. Incoming interns need to be made aware of this source of assistance, to know who their assigned advisor is, and how to reach them. As not every intern may need help from a student advisor, interns (and/or their mentors) might be contacted some time after the start of the internship reminding them of the system and who (and where) their advisors are in case the need arises. It should also be noted that graduate students voiced a need for peer mentoring.

Entering the Internship Program, and the Intern-Job Matching Process (Chapter 5A)

Only one survey question (11B, 1998 and 11, 1999) addressed application and appointment issues. Interns were asked to “comment on the on-line application” following a question in which they were asked to rate the on-line application process in comparison to “annually submitting a resume and a written employment application.”

The survey did not specifically ask interns to explain how they heard about the internship program, or to evaluate program advertisement, recruitment, the selection and hiring process, or the processes by which applicants are matched with particular work positions. However, interns commented on all except the first of these issues in their write-in comments in answer to Question 11.

Learning about the Program: Of the 83 interns interviewed, 72 offered information about how they heard about the LANL internship program. What is striking about their answers is how many of this sample of interns (i.e., 82%; n=59) were drawn to apply for an internship on the basis of informal contacts and word-of-mouth descriptions of the opportunities available at LANL. In 20 interviews, interns assessed the internships as insufficiently publicized and suggested improved communication with schools and universities to increase awareness. Interns of color, especially, reported how little the members of their own minority groups knew about the opportunities offered at LANL.

On-Line Application: Both survey and interview observations offered approval for the on-line application system; interns said that the process was easy and convenient and helped to streamline the bureaucratic hiring process. Interns with experience of the traditional application system had found electronic application easier, faster, and more convenient than application by paper methods. However, there was a division of opinion among the interns about this. Some survey commentators described the process as lengthier than necessary, and were frustrated by problems with the program: insufficient directions, editing or format options, and a restrictive structure.

Negative assessments of the on-line application system also included those from returning, year-round, international, and high school interns who were frustrated by having to complete full applications for each return. They suggested introducing a shorter form that would reference their original application and bring it up to date. Interns also pointed to administrative problems with the use of the on-line system. The problems of administrative delays in responding to applications, lost applications, errors—and slowness in correcting them—were also reported in both qualitative data sets. These had not necessarily been resolved by the introduction of the on-line system.

Two groups reported more problems with the on-line application. Some high school interns (in the survey data) had problems with gaining access to a computer, and suggested the option of a paper application process. All of the international interns interviewed, and two of those who offered written comments, found the application process more tedious and time consuming to complete than had their US peers with whom they compared notes. They also found cultural biases in the application form that made some questions hard to respond to. As well, a lack of co-ordination between departments involved in processing their applications was noted as causing difficulties.

The Hiring Process: In 16 interviews where the processes by which interns were placed in the internship were discussed, interns were critical. The screening process was argued to rely over-heavily on academic record without taking research background, work, or other relevant experience or career interests, into consideration. The process of

reviewing resumes was thought to over-rely on key words in order to place applicants into categories without the reviewer reading the entire resume. That these concerns were expressed in 12 (of 16) focus groups with all-female interns is notable.

Interviewees and survey respondents also raised questions about the efficacy and fairness of LANL's hiring process. Some interns wondered whether the 'right' people ever saw their applications, and suspected that some supervisors did not know about, or use, the on-line application database in searching for appropriate applicants.

Matching Interns with Appropriate Work Positions: Interviewees expressed concern that they could not discern any consistently applied rationale for placing interns within particular departments or divisions. Speakers in 14 focus group discussions (nine with undergraduates and five with graduates) argued from observation of negative consequences that the resume screening process should be done with greater care in order to ensure that individuals and positions were more appropriately matched. Although placement was formally based on academic record, interns saw inconsistencies in job matches. Some interns were observed to be unqualified for the work they were asked to do; some had been inappropriately placed; some were in situations where their skills and knowledge were not drawn upon; and some had insufficient work to do.

Nine of the groups where complaints about the job-matching process were made were composed entirely of female undergraduate interns, eight were composed of interns in office/administrative positions, and 10 were composed of first-time interns.

The interviewers also encountered a strong belief among interns (in 12 undergraduate and five graduate interviews) that it is important, even necessary, to know somebody at LANL in order to be hired, and that this (rather than the formal application process) was the way people normally get jobs at LANL. They thought that this could explain why some interns were observed in roles for which they were under-qualified or had little work to do. Some interviewees credited their own hiring to someone already at LANL who had helped them to get their current job.

Some survey comments writers also wondered whether it was possible to get a work placement that reflected their qualifications, experience, and interests without having "connections." Cynicism about the fairness of the hiring and job-matching system prompted some survey commentators and interviewees to encourage prospective interns to directly contact prospective mentors and department supervisors to increase their chances of being hired and securing appropriate work placement.

These common beliefs about the hiring and job-matching processes undermine interns' confidence in the fairness and appropriateness of both the hiring and job placement system, particularly (as suggested in the interview data) among female undergraduate interns, and, as such, may warrant further inquiry and consideration.

Orientation Package: The only qualitative data on this issue is slight: from the survey comment data there were 49 evaluative comments in 1998 (80% of which were positive

and 20% were negative) and 34 evaluative comments in 1999 (of which 59% were positive, and 41% were negative). Positive comments described the orientation packet as a helpful source of information that served as a good introduction to LANL. Criticisms focused on information overload, and details that were hard to understand (for example, on insurance coverage and other benefits). Interns' advice for improving the orientation packet centered on wanting more information about LANL itself, about its geographic setting and local amenities, and how to navigate the LANL system as an employee.

Survey Comments on the Efficacy of the Work Plan: Question 6B (1998 and 1999) asked, "How well did the work plan describe the work you actually did during your appointment?" In 1998, 140 positive comments were offered about how well the Educational Work Plan (EWP) was reflected in their work, and 129 positive observations were offered in the 1999 survey. Poor work plan/job matches were reported by 56 interns in 1998 and by 60 interns in 1999.

Interns' most frequent positive response was that the work they had done was what they had expected, given the description in their EWP (1998: n=31, 1999: n=22). Reports that their EWP's objectives had been accomplished were 22 in 1998 and 15 in 1999, and that the EWP had given their work a useful direction were nine times in 1998, and 21 times in 1999. Interns also appreciated flexibility in their work plans.

Interns used the same set of criteria to evaluate their work plans as they did to judge positive work experiences:

- Working in a position related to one's education or career goals
- Having the opportunity to learn new things
- Having control over the work they were doing (working independently)
- Being engaged in work that was personally challenging and meaningful:
- Variety in their work or projects
- A good relationship with their mentor

Interns who wrote about poor internship experiences often cited their work plan as contributing to their disappointments. These criticisms included:

- Performing work that was different from what they expected to be doing, given the work plan that was presented to them
- Placement in an internship unrelated to their interests
- Work plans that were too vague to be useful

Interns' negative comments on the work plan also reiterated problems that were described in negative evaluations of the work experience—boring, repetitious, "busy" work, or not having enough work to do.

The balance of comments on the fit between interns' work plans and their actual work (as reflected in survey comments) is, broadly, 70 percent positive and 30 percent negative. However, evaluations of the Educational Work Plan should be read in light of

the question raised in the previous section: how effectively does the system that is intended to match interns to relevant work assignments operate in practice? Unless the formal matching system works as intended—on the basis of interns' qualifications, work experience, and interests—and is not undermined or circumvented by personal contact—the Educational Work Plan will be prevented from working effectively for all interns.

Interns' Perceptions of the Adequacy of Financial Support for the Internship Program (Chapter 5B)

Information about how well the internship program appeared to be supported by the departments in which interns worked was offered only in the interview data. In the majority of interviews (34 of 47) one or more interns said that they had seen no evidence that the internship program was other than well supported in terms of funding and available resources. In 22 interviews, interns expressed confidence that funding for the internships in their department was adequate. However, in nearly half of all interviews (21 of 47) expressions of concern were voiced about program funding. The majority of these (i.e., 18) came from interviews with graduate interns. In 14 interviews, graduates expressed concerns about their academic and professional futures where they judged their departments to be under-funded, or continued support for the project on which their graduate research was felt to be uncertain. Other graduate concerns focused on deficiencies in the tools they needed to do the work: in four graduate interviews (and one survey comment), interns reported lack of computer terminals.

The concerns of undergraduates focused on an apparent uneven-ness of financial provision for interns among departments, which they saw as affecting their placement choices. Concerns that funding for recruitment of minority interns may have been cut was also expressed.

Uncertainties about funding for the internship program, for particular projects, and about the distribution of funds across departments also raised in 15 interviews the question of job security. Those interns in 12 interviews who expressed confidence about their job security were notably male undergraduates in OS/GS positions.

Interns' Opinions as to the Adequacy of their Salaries (Chapter 5C)

Interns' opinions as to the adequacy of their salaries were, again, offered only in the interview data. A wide range of opinions was expressed across the 47 interviews that discussed this issue. At one extreme (in 10 interviews with graduates), interns expressed only satisfaction. At the other extreme, the members of three undergraduate focus groups were unanimous in their dissatisfaction. In the other 31 groups, opinions were mixed. Across all interviews, indications of satisfaction were more frequent (i.e., in 32 interviews) than indications of dissatisfaction (i.e., in 15 interviews).

Interns of color expressed more satisfaction with their levels of remuneration than did white interns. However, white interns also expressed less dissatisfaction—largely because they said less about salary (good or bad) than did interns of color. Only in three

(of 14) interviews did white interns express negative views, compared with six (of 15) in Hispanic groups, three (of eight) in Asian groups, and interns in all four of the Native American groups. Only in the six African-American groups did no one express dissatisfaction with their level of pay.

More men expressed dissatisfaction with their salaries than did women: complaints were registered in 10 of the 24 interviews with male interns, compared with six of the 23 interviews with female interns.

In 26 interviews, interns offered relative assessments of their salary that took personal factors and/or the local context into account. Interns judged the value of their paychecks largely by the high cost of living in the Los Alamos area. Those undergraduates who were local residents expressed more satisfaction (or less dissatisfaction) than did undergraduate interns from farther away, and than did all graduate interns (fewer of whom were local).

Interns' Observations on Their Housing Situation (Chapter 5D)

In all 21 of the interviews with graduate students, and in 20 (out of 26) of those with undergraduates, interns were asked about housing issues. In 73 percent of these groups (30 out of 41), interns defined housing as a problem. In 19 graduate interviews, discussion focused on the limited supply, poor quality, and high cost of housing in the Los Alamos area. Housing concerns were also far more commonly and strongly expressed in interviews with women (14 out of 23) than in interviews with men (5 out of 24). Graduate women in science and technology positions expressed more concerns about housing than any other group.

Those who had worked at LANL for one year or less (13 interviews) experienced more housing difficulties than the interns who had worked at LANL for more than one year (6 interviews) and who had found ways to resolve their housing problems—some by purchasing houses. In only four interviews (three graduate and one undergraduate) did interns report that they had found good, affordable housing.

From the survey comments data, interns were quite critical of the housing situation: there were more than five times the number of negative observations (n=91) than there were positive (n=17). As in the interview data, interns' problems with housing included high cost, poor quality, and limited availability; they also wrote about their time and trouble in finding somewhere to live.

Interns mentioned that the high cost of housing (often combined with the additional living costs created by lack of access to a kitchen, even in student housing) meant that they could not save any money from their summer earnings. Some interns considered the housing situation to be so “bad,” they said it served as a strong disincentive to working at LANL in the future.

Interns asked LANL to address the chronic housing shortage, its high cost, and to improve the quality of available housing.

***Interns' Observations on Living in Los Alamos (Including Transportation Issues)
(Chapter 5E)***

Interns in 13 interviews (two graduate, 11 undergraduate) described what they liked about living and working in the Los Alamos area—its natural beauty, convenient summer work for local students, and, for interns with families, a good, safe place to raise children. There were, however, over twice as many complaints about the problems of living in the Los Alamos area as there were positive assessments. Many complaints referenced the difficulties of finding affordable housing, the city's geographical isolation, and its limited amenities. (A limited number of places in which to eat, and early closing hours were problems because many interns worked late, and those in student housing had no kitchen facilities.) The slowness and dangers of commuting to LANL, and insufficient parking on site was discussed in 16 interviews (six graduate and 10 undergraduate).

These problems were raised in 29 interviews (nine graduate and 20 undergraduate), 23 of which were in science and technical positions, and 11 with interns who were returning for a second or subsequent internship.

Clearly, many of these difficulties, especially those related to commuting, derive from the housing problems of interns discussed above.

Interns' comments about transportation were offered in answer to Question 15B on housing and transportation (in the 1999 survey only). There were just 40 comments. Of these, 13 comments were positive, seven were negative, and 20 offered advice or general observations. As in the interview data, respondents to this question pointed to problems in getting to work. Interns who commuted to work, commented upon traffic jams, highway construction, and the high local price of gasoline.

The topic most frequently commented upon, however, was LANL's taxi service. Positive evaluations were especially complimentary about the taxi drivers. Negative evaluative statements concerned the limitations of LANL's transportation services, and their advice to LANL directly addressed these shortcomings: interns asked LANL to extend the hours of the taxi service and its pick-up locations, and to provide a shuttle service (that also runs on the weekends) to and from local cities.

Interns' Observations on the Utility of the Student Programs' Web site (Chapter 5F)

The 75 percent of interns who answered Question 10A: "How would you rate the information provided for you at the Student Programs' web site?" rated it highly, and at a response rate that was higher for graduates than undergraduates. Qualitative information on the Student Programs' web site was offered only in the survey comment data. Across both years, there were 81 evaluative observations of which 54 (67%) were positive, 19 (23%) were negative, and eight (10%) gave mixed reviews of the site's utility. More

observations were offered in the 1998 survey (n=92) than in 1999 (n=65) and more of the 1998 evaluative observations were positive (i.e., 37 in 1998 versus 17 in 1999).

The two most commonly offered positive observations were, that the web site was informative, user-friendly, and an effective means by which to convey information to interns, and that, although these writers had rarely used the Student Programs' web site, they had found it to be helpful when accessed.

The total number of negative comments offered by interns was low (1998: n=8, 1999: n=11). The commonest complaint was that the site was not kept up to date. Other problems included difficulties in accessing the web site, finding specific information, and with links that would not open.

More interns offered advice about how to improve the Student Programs' web site than offered complaints about it. Interns wanted the following:

- More and different types of information to be posted on the web site
- Ways in which to communicate with, or learn about, the people working at LANL
- Numbers and names of people to contact about specific questions
- Current job listings
- Updated information about student activities
- Help in finding housing
- A listing of various LANL procedures and directions they should follow

The Student Programs' web site, thus, was valued by those who used it, but it could usefully be expanded to meet a wider array of needs. Interns' advice to LANL about the web site included the need for technical maintenance, regular updating of its content, and (by implication) an allocation of regular funding to secure these services.

Interns' Sense of Community, and the Role of the Student Government Association (SGA) in Fostering It. (Chapter 5G)

Information on the degree to which interns experienced a sense of community at LANL came only from the interview data. The survey and survey comments data reference the contribution of the Student Government Association's activities in creating community feeling.

Far more of the interns in undergraduate interviews (22 out of 23) than those in graduate interviews (13 out of 21) reported a sense of belonging to a community. The following observations were offered either exclusively, or mostly, by undergraduate interns to explain why they felt a sense of community at LANL:

- Liking their co-workers and/or appreciating fellow interns
- Being treated as equals by the regular staff
- Being treated with respect and given responsibility

- Having a good relationship with their supervisor
- Experiencing fairness and even-ness in the enforcement of rules
- Experiencing good communication with other departments, and appreciation of efforts to promote inter-departmental awareness

Both graduate and undergraduate interns thought that student housing helped to promote a sense of community among interns (as well as meeting an acute need for affordable accommodation).

Undergraduate observations tended to focus on the social context of their work, whereas graduate interns' observations were more focused on the nature and conditions of the work itself. Thus, where undergraduate interns felt that the sense of community at LANL was missing or limited, their reasons again referenced the atmosphere or social milieu in which they worked.

A recurrent theme in discussions on a variety of topics was the difference in the quality of the internship experience for local and non-local interns. On the issue of community, local interns appreciated the economic, educational, and social contributions to the local community made by LANL and felt a sense of loyalty to 'the Lab' because of these.

Role of the Student Government Association: Survey Question 13 A asks, "Do/did you participate in any of the Student Association activities? Question 13B asks, "If yes, how would you rate them?" Approximately 55-60 percent of the survey respondents offered 'not applicable' responses to these questions and the means for respondents were low. Of the comments evaluating the SGA's contribution to community life at LANL, 65 percent (n=145) were positive, and 35 percent (n=79) were negative. There were also 42 pieces of advice about how to improve what was offered.

Although evaluations of the SGA social program contained in the two qualitative data sources were broadly positive, it appears that most interns who wrote or spoke on this issue actually made quite limited use of the social activities offered by the SGA (this was especially true of graduate students, who saw SGA activities as being directed at undergraduates). Regular participants in SGA activities (who were largely enthusiastic about them) were a distinctive subset that was more undergraduate than graduate, younger than older, more white than non-white, more American than foreign, more "visiting" than local, and more single than married, and more without than with children. Differences by gender were, however, not clearly established in the data: this perhaps should be clarified in subsequent evaluations of the SGA's utility to interns.

The Prestige and Reputation of LANL: Interns' Perceptions of the Effects of Recent Security Problems and of the Los Alamos Fire (Chapter 5H)

The interviewers were asked to explore the impact on year 2000 interns of the (then recent) publicity given to security problems, and their experience of the Los Alamos fire.

Security Issues: In 18 interviews (four graduate and 14 undergraduate) interns thought that LANL's reputation had been compromised by recent security problems, while in 12 interviews (three graduate and nine undergraduate), interns saw LANL's public image as undiminished. In 16 interviews, (one graduate and 15 undergraduate) the publicity given to recent security problems was not seen as an issue for them, and had not affected their work. It is notable, however, that most opinions (whether positive or negative) were offered by undergraduates. Graduates were less likely to venture an opinion either way.

Interns noted that the number and frequency of security check procedures had increased, and chafed at new restrictions, the longer time that security clearance now took, and the slow-down in their work that these created. Security meetings and stand-downs were seen as too numerous, and time consuming, disruptive to the workflow, and as restricting communication between employees and departments. Six graduate students reported that their work had been significantly disrupted. Some computer use depended on the level of clearance given, as also was access to those mentors who were "on the other side of the security fence."

The application rate of international interns was predicted to be affected, in that they might be less willing to undergo the more extensive scrutiny (or to re-experience the layers of bureaucratic paperwork) required to achieve security clearance, and might presume that they would be less welcome at LANL than hitherto.

Impact of the Los Alamos Fire: Negative effects of the Los Alamos fire were described in 29 interviews and 45 individual observations. These included the immediate effects of the fire on interns' work, housing, and/or personal life. Ten graduate students (only) reported interruption of work on their projects as an immediate consequence of the fire. In 24 interviews, 36 interns reported that the fire had made no significant impact on their work, housing, and/or personal life. Overall, the fire's impact was described largely in personal and community terms rather than in relation to LANL.

Interns' View of the Prestige of Working at LANL: In 26 interviews, interns described LANL as a prestigious place to work regardless of recent events, including 19 interviews—six with graduates and 13 with undergraduates—in which interns had been motivated to apply because of the prestige of working at LANL.

However, most interviewees showed little or no awareness of the tacit organizational expectation that interns will become "ambassadors" who will support and enhance LANL's reputation in their present and future spheres of influence.

Interns' Observations on Safety Training and on Safe Practice in Their Work Settings (Chapter 5I)

Almost all of the qualitative information on interns' responses to safety issues was contained in the survey comment data. (The limited amount of information contained in the interview data was reported in Chapter 4B.) The two surveys asked somewhat different questions about safety. In 1998, written comments followed question 8A that

asks, “Do you feel that you were given sufficient safety training to do your job in a safe manner?” In 1999, Question 8A was changed to: “Do you feel that the subject and practice of safety was taken seriously by your co-workers, managers and fellow employees?” Both of these questions were highly scored (i.e., above 95%).

The question posed in 1999 generated far fewer negative write-in comments than that posed in 1998 (i.e., 1998: 26 negative observations vs. 92 positive observations; 1999: 67 negative observations vs. 69 positive observations).

1998 Survey Question on Safety Training: The most common individual comment (n=69; 51% of evaluative observations) was that safety training, or safety at LANL overall, was very good. These interns portrayed safety as an issue that is emphasized by the LANL staff, and felt themselves to be well-protected by the comprehensive and mandatory training they received in their work units before beginning new work.

Negative answers largely focused on estimates of training sufficiency. The most common complaints (n=36; 54%) were: that more training was given than was actually needed for the work that they did; that they received repeat sessions on the same procedures; that they were made to feel incompetent in doing simple tasks; and felt frustrated that unnecessary training took time away from work. Those who worked in offices were most apt to report that they had been required to take safety training that was not relevant to their jobs.

As the very high survey responses also indicate, most interns appeared to support LANL’s emphasis on safety. Their main caveat was that training should be relevant to the work done.

1999 Survey Question on Employee Attitudes Toward Safety Practices: The 1999 survey question asked interns to assess how seriously co-workers, managers and other interns appeared to regard the practice of safety at LANL. Seventy-eight percent of the interns (n=92) who offered evaluative comments indicated that: safety was treated as a very important matter by their work group; safety training and the resultant level of safety were excellent at LANL; that they felt safe doing their work; and/or that their mentors and supervisors stressed safety.

As with the responses to the 1998 survey, the primary criticism in the 1999 comments was that safety training was out of line with the risks of particular kinds of work, that valuable work time was lost, and that interns sometimes felt insulted by the low level of the training given. These concerns were 22 percent (n=26) of all evaluative comments in answer to the 1999 survey, and the caveats raised mirror those of the 1998 survey.

The Intention to Apply for Further LANL Internships (Chapter 5J)

In the interviews, interns were asked if they would like to return to LANL for another internship: in 17 interviews, interns offered affirmatives, seven interviews

included negatives, and a further 12 included “maybe” responses. Clear intentions to return were almost exclusively offered in undergraduate interviews (16 out of 17). They were also offered in more interviews with men than with women (i.e., in 12 male and five female groups), and in a higher proportion of interviews with students of color (11 out of 33) than with white students (6 out of 14).

From the survey comments data, eight interns voiced strong interest in returning for another internship; three wanted to return to do work on their thesis; and one intern wanted to return to LANL to do more research work.

Interns’ Perceptions of Issues Related to Gender (Chapter 6)

Information on gender issues (and also on race/ethnicity) was provided largely by interview data. Individuals in 12 interviews with women and in 11 interviews with men reported that they were unaware of any gender-related problems. In nine interviews, returning interns thought improvements had been made in the balance of employment between men and women and/or in the climate for women employees. However, gender-related problems were discussed in almost half of all interviews (i.e., 21 out of 47).

The most commonly reported issue concerned what interns saw as an imbalance between the sexes in the distribution of types of work. In 10 interviews with women and five with men, interns felt that LANL employs too few women. They drew on their experience of other work contexts to point to what they saw as an unusually low proportion of women to men. In three further women’s interviews, the small number of women in leadership positions was noted. In two interviews with women and one with men, interns commented that the gender balance varied considerably by department and division, and that the majority of both female workers and female interns were working in administrative or other support capacities. In their comments, interns portrayed LANL as an organization that has become out of touch with the increasingly gender-balanced world to which they are accustomed.

Some returning interns saw the climate for women as improved, and credited this to the introduction of diversity training. Members of a male graduate focus group described female LANL employees as more approachable and pleasant than men in a climate that they described as encouraging men to exhibit dominating behavior. Continuing problems for women interns and employees were also described (notably lack of support, discounting of their expertise or views, and restricted communication). One female intern (only) in the interview sample reported an experience of sexual harassment—an incident that LANL has also documented and formally responded to.

From the interview data alone, it is impossible to estimate the dimensions of these problems, or whether other cultural climate problems exist to any degree. An extension of future survey comments questions to solicit information would be useful.

Interns' Perceptions of Issues Related to Race/Ethnicity (Chapter 7)

Interviewees were asked whether they had experienced, or observed, any problems related to race/ethnicity, and interns in 39 of the 47 focus groups responded to this question. In 19 interviews (14 with students of color and five with white interns), one or more of the interns had experienced or observed particular race/ethnicity problems. In seven of these interviews (five of color and two white) interns described instances of discriminative or racist behavior (towards themselves or others) at LANL, and these observations were not contested, or interpreted in alternative ways, by other group members. Interns in 12 interviews (nine of color and two white) had observed no overt discrimination or racist behavior, but commented on the under-representation of non-white employees and interns in some areas of work, and/or at some administrative levels.

Undergraduates appeared slightly more likely to report racial/ethnic problems than graduate interns (i.e., in 18 out of the 26 undergraduates, compared with 12 of the 21 graduates). Interns of color noticed more overt discrimination or racist behavior and also more under-representation in areas of employment than did white interns. The problems identified by both groups were of three types: mal-distribution of employment in particular work roles by race/ethnicity; prejudice or discrimination expressed towards particular groups; and an uncomfortable work climate for interns of color.

Interns observed that people of color were under-represented among LANL employees overall, and that employees of particular racial/ethnic groups were concentrated in particular types of work. Both interns of color and minority LANL support staff were seen to be under-represented in science and technology roles, and to be over-represented in office/administrative roles. These observations are supported by the descriptive statistics provided by the 2000 survey data that also highlight the over-representation of white interns (relative to their overall numbers) and under-representation of Hispanic interns in science and technical positions. By contrast, Hispanic interns (especially) are over-represented and white interns are under-represented in office/administrative positions. There were no data available to the researchers that would clarify the causes of this work distribution.

In five graduate and five undergraduate interviews, interns noticed that international interns (particularly Asians) were treated by LANL staff (and some interns) as if they represented a security risk. As also noted in Chapter 5G, some international interns thought that they were excluded from certain activities, including those offered by the SGA.

Slight evidence was offered of social avoidance in some divisions or work groups, lack of communication across racial/ethnic lines, and of tensions that arise intermittently between Hispanic and non-Hispanic interns, specifically. Again, the data are not, in themselves, sufficient to give estimates of the extent or seriousness of these problems. Soliciting information in future write-in comment questions might be useful.

The most evident race/ethnicity problem for the program, therefore, would seem to be whether and how the mal-distribution of internships between majority and minority groups can be addressed.

Recommendations for Enhancement of Internship Program Evaluation

a. The Student Exit Survey

The student exit survey is well written and covers the range of concerns articulated in the documents from the SPAC. The analysis did not reveal any aspects of the survey that require fundamental revisions. However, some recommendations are offered below that could improve the survey's accuracy and utility, and facilitate its analysis.

1. *Number all of the survey questions.* Doing so would facilitate the analysis by removing a time-consuming clerical task.
2. *The ordinal question response values should be reversed.* In the existing scale, 1 denotes the most positive evaluation and 5 the most negative. Reversing this so that 5 equals the most positive evaluation would bring the survey into conformity with standard survey practice.
3. *All ordinal questions should use the same scale.* As noted above, question 14a used a different scale, making comparison of results impossible.
4. *"Yes/No" question response categories should be the same throughout the instrument.* The survey's nominal questions have differing response categories. Some give the options of "yes/no/N/A," while others give the options of "yes/no"/blank or "yes"/blank. The "yes/no/N/A" format should be used for all of these questions. Allowing for a blank response makes it easier for students to skip the question. Offering only meaningful categories compels students to provide a response, increasing the overall response rate.
5. *Increase the space available for written comments.* It is apparent that interns were able to write more text in the comment question "spaces" than the virtual spaces could hold. Many comments were, therefore, cut off in mid-sentence or mid-word. The value of the survey comment data is clear throughout this report. Creating more space for written comments would provide more clarification of the numeric scores, and, thus, a more complete analysis.
6. *Students should be asked to state their job category.* The aggregate information from the year 2000 was useful primarily because summary statistics included interns' job categories. Without this information, it would not have been possible to detect the over-representation of women and Hispanics in office jobs, and the over-representation of men and Whites in science and technical jobs.

7. *Question 7 should specify the nature of LANL's influence on interns' career plans.* Question 7 is a “yes/no” question that asks if the students’ career plans have been influenced by their LANL experience. As noted above, answers to this question could be interpreted two ways: a “yes” response could mean that the influence was positive or negative. The question should be re-worded so that the results can be read without ambiguity.

8. *Be specific and complete in the wording of questions: over-brevity creates ambiguity.* For example: Question 1B asks interns to rate the “Infrastructure?” as part of “Overall laboratory experience.” What “infrastructure” means to any interns is unknown. Similarly, Question 1C asks interns to rate “Extracurricular?” (activities) as part of their “Overall laboratory experience.” As discussed in Chapter 2, “extracurricular” is not sufficiently defined for analytical interpretation: does it reference Student Association activities, “life, in general” outside of working at LANL?

9. *Avoid asking about two aspects of an issue in any single question.* For example, if feedback is needed both on safety training (including its perceived relevance to the work being done), and on the level of safety practice observed in the interns’ work settings, these should be explored in two separate questions.

b. Suggestions for Further Evaluation

1. Interview mentors, student advisors, and program directors in order to clarify:
 - their reasons for participating in the program
 - what they hope to achieve and their criteria for success
 - what (further) professional development they need to play their roles well
2. Gather information on interns’ expectations/perceived needs upon entering the program (i.e., an internship entrance survey) to provide information about:
 - what interns hope to gain
 - what interns feel they can contribute

It would be helpful to include a checklist, as well as open-ended response alternatives. As discovered in the interviews, there are often common issues that students recognize once they’re alluded to, but which interns do not necessarily articulate without prompting. For example: exploring/defining/refining career goals is a common issue, but one that may be glossed if not asked about directly. Interns could be asked to rank their top 4 or 5 goals (from a longer list, with spaces for “other” goals).

3. In survey and survey comment questions, interns should be asked to distinguish between “availability” and the “responsiveness” of the mentor: in some telling cases, physically distanced mentors were highly responsive to their interns.

4. The information offered in this report on issues of gender and of race/ethnicity is incomplete, and it is recommended that ongoing program evaluation should explicitly seek to monitor progress in addressing the issues raised above. These include:
 - The balance between the sexes, and across racial/ethnic groups, in the distribution of jobs, and the selection and matching processes by which job placements are made.
 - The work-setting climate for under-represented groups, including the sources and extent of inappropriate speech and behavior
 - The incidence of harassment or discrimination by gender or race/ethnicity (both experienced and observed).

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APPENDIX A

Appendix A1

1. The Survey Questions.

The following are the survey questions as they appear on LANL's 1998 and 1999 exit surveys. All questions are answered on a five-point scale, unless they are yes/no questions, comments, or question #14a on the 1999 survey. (The latter is rated on a six-point scale.) The 1998 survey has 9 open-ended questions, and the 1999 survey has 11. The numbering scheme keeps numbers from original survey, but numbers were added where there were none. (For example, none of the "personal information" questions were numbered.)

The five categories of the scale:

1. excellent
2. very good
3. satisfactory
4. needs improvement
5. poor
- N/A

Personal information questions¹

- i. Name (optional)
- ii. Group
- iii. School (University affiliation)
- iv. Major/Minor
- v. Supervisor
- vi. Mentor
- vii. Ethnicity²
- viii. Gender³
- ix. Program in which you participate(d)
- x. What was the length of your appointment?
- xi. Was the main focus of your work assignment supporting your thesis?
- xii. Do you plan to continue your education beyond current degree program?

Please rate the following:

1. Overall laboratory experience:
 - a. work?

¹ Questions xi and xii are not personal information questions but questions more similar to the regular survey questions. Also, the phrase "personal information question" is not on either original survey but was coined by BSR researchers for organizational purposes.

² This item was on 1998 survey but not on 1999.

³ This item was also on 1998 survey but not on 1999.

- b. infrastructure?
 - c. extracurricular?
- 2. Applicability of the research experience to your academic field of study.
- 3. Working relationship with your mentor.
- 4a. Availability of mentor during research appointment.
- 4b. Comments on mentoring experience.⁴
- 5. Was your work plan (assignment) discussed before your student appointment began?
- 6a. How well did the work plan describe the work you actually did during your appointment?
- 6b. Comments on work plan.
- 7a. Has this experience had any influence on your career plans or goals?
- 7b. Please explain.
- 8a, 1998⁵: Do you feel that you were given sufficient safety training to do your job in a safe manner?
- 8a, 1999: Do you feel that the subject and practice of safety was taken seriously by your coworkers, managers and fellow employees?
- 8b. Comments on safety
- 9a. If you were NEW hire for the summer of 1998 (1999) and attended the New Student Orientation, was the Orientation packet you received useful?
- 9b. Comments or suggestions on the Orientation packet.
- 10a. How would you rate the information provided for you at the Student Programs Web site?
- 10b. Comments or suggestions for improving the web site.
- 11a.⁶ This year all students completed the NEW On-line Application. How would you rate it compared to annually submitting a resume and a written employment application?
- 11b. Comments about on-line application.
- 12. If you participated in a performance evaluation process please check all that apply.
 - a. Mentor Feedback Tool
 - b. LANL Performance Evaluation
 - c. Student Feedback Tool
 - d. None

⁴ The 1998 survey did not have a comments section for question 4.

⁵ The wording of question 8a is different in the two surveys.

⁶ The 1999 survey only has a comments section for question 11; it does not contain question 11a.

13a. Do/did you participate in any of the Student Association activities?

13b. If yes, how would you rate them?

13c. Comments on Student Association Activities.

14a. How would you rate your [sic] interaction/availability of your division's Student Advisor?⁷

14b. Comments on Student Advisor(s).

15. Comments on housing or transportation.⁸

16. Other comments or suggestions.⁹

⁷ On 1999 survey, this question is rated on a scale of 1-6 instead of 1-5.

⁸ This question is not on the 1998 survey.

⁹ This question is #15 on the 1998 survey (because of the absence of the question about housing and transportation).

Appendix A2

Categorical question means, standard deviations, and percentage and number of respondents choosing each response.

[illegible]

Appendix A3

Comparison of yes/no questions by survey year.

Question	year	%yes	n	%no	n	%N/A	n	%blank	n	response rate
xi.	1998	13.37%	54	20.05%	81	66.58%	269			
	1999	17.52%	58	16.62%	55	65.86%	218			
xii.	1998	76.24%	308	7.43%	30	16.34%	66			
	1999	71.60%	237	8.16%	27	20.24%	67			
5	1998	84.41%	341	13.37%	54			2.23%	9	97.77%
	1999	82.78%	274	12.99%	43			4.23%	14	95.77%
7a.	1998	72.28%	292	21.04%	85			6.68%	27	93.32%
	1999	70.39%	233	24.17%	80			5.44%	18	94.56%
8a.	1998	96.78%	391	0.50%				2.72%		97.28%
	1999	94.86%	314	1.21%	4			3.93%	13	96.07%
9a.	1998	34.16%	138	6.19%	25			59.65%	241	40.35%
	1999	33.84%	112	8.76%	29			57.40%	190	42.60%
12a.	1998	17.08%	69					82.92%	335	17.08%
	1999	15.41%	51					84.59%	280	15.41%
12b.	1998	11.39%	46					88.61%	358	11.39%
	1999	9.37%	31					90.63%	300	9.37%
12c.	1998	17.57%	71					82.43%	333	17.57%
	1999	15.41%	51					84.59%	280	15.41%
12d.	1998	36.88%	149					63.12%	255	36.88%
	1999	35.65%	118					64.35%	213	35.65%
13a.	1998	41.34%	167	55.20%	223			3.47%	14	96.53%
	1999	44.71%	148	47.73%	158			7.55%	25	92.45%

Appendix A4

Categorical questions by program (graduate, undergraduate, High School, and “other”).

Program		mean	s.d.	5		4		3		2		1		N/A		n	
1a.	GRA	1998	1.63	0.70	0.00%	0	1.25%	1	8.75%	7	41.25%	33	48.75%	39	0.00%	0	80
		1999	1.77	0.79	0.00%	0	0.00%	0	21.88%	14	32.81%	21	45.31%	29	0.00%	0	64
	- HS Co-op	1998	1.90	0.70	0.00%	0	0.00%	0	20.00%	2	50.00%	5	30.00%	3	0.00%	0	10
		1999	2.00	0.85	0.00%	0	9.09%	1	9.09%	1	54.55%	6	27.27%	3	0.00%	0	11
	- "other"	1998	2.00	0.69	0.00%	0	3.70%	1	7.41%	2	51.85%	14	14.81%	4	22.22%	6	27
		1999	1.93	0.80	0.00%	0	4.76%	1	4.76%	1	38.10%	8	19.05%	4	33.33%	7	21
	- UGS	1998	1.95	0.80	1.05%	3	2.09%	6	16.72%	48	48.78%	140	28.57%	82	2.79%	8	287
		1999	1.99	0.94	0.43%	1	7.23%	17	18.72%	44	36.60%	86	35.74%	84	1.28%	3	235
1b.	GRA	1998	2.37	0.93	2.50%	2	7.50%	6	27.50%	22	42.50%	34	15.00%	12	5.00%	4	80
		1999	2.47	0.88	0.00%	0	12.50%	8	31.25%	20	37.50%	24	12.50%	8	6.25%	4	64
	- HS Co-op	1998	2.30	0.90	0.00%	0	10.00%	1	30.00%	3	40.00%	4	20.00%	2	0.00%	0	10
		1999	2.13	0.60	0.00%	0	0.00%	0	18.18%	2	45.45%	5	9.09%	1	27.27%	3	11
	- "other"	1998	2.14	0.77	0.00%	0	0.00%	0	29.63%	8	29.63%	8	18.52%	5	22.22%	6	27
		1999	2.50	0.87	0.00%	0	4.76%	1	28.57%	6	14.29%	3	9.52%	2	42.86%	9	21
	- UGS	1998	2.33	0.83	0.00%	0	6.27%	18	33.10%	95	37.63%	108	15.33%	44	7.67%	22	287
		1999	2.37	0.87	0.43%	1	8.09%	19	31.91%	75	37.87%	89	14.89%	35	6.81%	16	235
1c.	GRA	1998	2.38	0.95	1.25%	1	7.50%	6	26.25%	21	28.75%	23	15.00%	12	21.25%	17	80
		1999	2.64	0.93	1.56%	1	12.50%	8	23.44%	15	29.69%	19	6.25%	4	26.56%	17	64
	- HS Co-op	1998	2.56	0.68	0.00%	0	10.00%	1	30.00%	3	50.00%	5	0.00%	0	10.00%	1	10
		1999	2.50	0.50	0.00%	0	0.00%	0	27.27%	3	27.27%	3	0.00%	0	45.45%	5	11
	- "other"	1998	2.59	0.97	3.70%	1	7.41%	2	14.81%	4	33.33%	9	3.70%	1	37.04%	10	27
		1999	2.45	0.89	0.00%	0	9.52%	2	9.52%	2	28.57%	6	4.76%	1	47.62%	10	21
	- UGS	1998	2.60	0.92	1.74%	5	7.32%	21	32.40%	93	20.56%	59	9.41%	27	28.57%	82	287
		1999	2.42	0.89	1.70%	4	5.11%	12	27.23%	64	30.64%	72	10.64%	25	24.68%	58	235
2	GRA	1998	1.75	0.86	0.00%	0	3.75%	3	15.00%	12	31.25%	25	46.25%	37	3.75%	3	80
		1999	1.60	0.90	3.13%	2	0.00%	0	9.38%	6	28.13%	18	57.81%	37	1.56%	1	64
	- HS Co-op	1998	3.00	1.63	10.00%	1	0.00%	0	10.00%	1	0.00%	0	10.00%	1	70.00%	7	10
		1999	2.57	0.49	0.00%	0	0.00%	0	36.36%	4	27.27%	3	0.00%	0	36.36%	4	11
	- "other"	1998	2.26	1.33	7.41%	2	3.70%	1	18.52%	5	11.11%	3	29.63%	8	29.63%	8	27
		1999	1.79	0.86	0.00%	0	4.76%	1	4.76%	1	28.57%	6	28.57%	6	33.33%	7	21
	- UGS	1998	2.20	1.08	3.14%	9	6.27%	18	14.29%	41	28.92%	83	21.25%	61	26.13%	75	287
		1999	2.09	1.16	5.11%	12	4.68%	11	17.87%	42	24.26%	57	34.89%	82	13.19%	31	235

Appendix A4, continued

	Program		mean	s.d.	5	4	3	2	1	N/A	n						
3	<u>GRA</u>	1998	1.51	0.83	1.25%	1	2.50%	2	6.25%	5	23.75%	19	61.25%	49	5.00%	4	80
		1999	1.57	0.82	0.00%	0	3.13%	2	10.94%	7	21.88%	14	57.81%	37	6.25%	4	64
	<u>HS Co-op</u>	1998	1.30	0.46	0.00%	0	0.00%	0	0.00%	0	30.00%	3	70.00%	7	0.00%	0	10
		1999	1.64	1.15	0.00%	0	18.18%	2	0.00%	0	9.09%	1	72.73%	8	0.00%	0	11
	<u>"other"</u>	1998	1.67	1.04	0.00%	0	7.41%	2	11.11%	3	7.41%	2	51.85%	14	22.22%	6	27
		1999	1.86	1.36	4.76%	1	9.52%	2	0.00%	0	9.52%	2	42.86%	9	33.33%	7	21
	<u>UGS</u>	1998	1.62	0.94	2.09%	6	2.44%	7	9.76%	28	22.30%	64	55.75%	160	7.67%	22	287
		1999	1.54	0.90	1.28%	3	3.83%	9	8.09%	19	18.72%	44	63.83%	150	4.26%	10	235
4	<u>GRA</u>	1998	1.66	0.86	0.00%	0	3.75%	3	13.75%	11	25.00%	20	53.75%	43	3.75%	3	80
		1999	1.80	1.00	1.56%	1	4.69%	3	15.63%	10	23.44%	15	48.44%	31	6.25%	4	64
	<u>HS Co-op</u>	1998	1.63	0.86	0.00%	0	0.00%	0	20.00%	2	10.00%	1	50.00%	5	20.00%	2	10
		1999	1.38	0.48	0.00%	0	0.00%	0	0.00%	0	27.27%	3	45.45%	5	27.27%	3	11
	<u>"other"</u>	1998	1.85	1.19	3.70%	1	7.41%	2	3.70%	1	18.52%	5	40.74%	11	25.93%	7	27
		1999	1.69	1.07	0.00%	0	9.52%	2	0.00%	0	14.29%	3	38.10%	8	38.10%	8	21
	<u>UGS</u>	1998	1.80	1.00	2.44%	7	3.48%	10	10.45%	30	26.48%	76	41.11%	118	16.03%	46	287
		1999	1.69	1.02	2.55%	6	2.98%	7	9.79%	23	18.72%	44	48.94%	115	17.02%	40	235
6a.	<u>GRA</u>	1998	1.83	0.87	1.25%	1	2.50%	2	12.50%	10	37.50%	30	36.25%	29	10.00%	8	80
		1999	2.10	0.84	1.56%	1	1.56%	1	23.44%	15	42.19%	27	21.88%	14	9.38%	6	64
	<u>HS Co-op</u>	1998	2.00	0.63	0.00%	0	0.00%	0	20.00%	2	60.00%	6	20.00%	2	0.00%	0	10
		1999	2.00	1.33	9.09%	1	0.00%	0	18.18%	2	9.09%	1	45.45%	5	18.18%	2	11
	<u>"other"</u>	1998	2.00	0.92	0.00%	0	7.41%	2	7.41%	2	33.33%	9	22.22%	6	29.63%	8	27
		1999	1.80	0.60	0.00%	0	0.00%	0	4.76%	1	28.57%	6	14.29%	3	52.38%	11	21
	<u>UGS</u>	1998	1.99	0.93	1.74%	5	4.53%	13	14.63%	42	40.07%	115	29.97%	86	9.06%	26	287
		1999	2.03	0.94	2.13%	5	4.26%	10	15.74%	37	39.57%	93	27.66%	65	10.64%	25	235
10a.	<u>GRA</u>	1998	2.33	0.65	0.00%	0	2.50%	2	30.00%	24	47.50%	38	6.25%	5	13.75%	11	80
		1999	2.42	0.83	1.56%	1	4.69%	3	29.69%	19	37.50%	24	9.38%	6	17.19%	11	64
	<u>HS Co-op</u>	1998	2.33	0.67	0.00%	0	0.00%	0	40.00%	4	40.00%	4	10.00%	1	10.00%	1	10
		1999	1.71	0.45	0.00%	0	0.00%	0	0.00%	0	45.45%	5	18.18%	2	36.36%	4	11
	<u>"other"</u>	1998	2.36	0.89	0.00%	0	3.70%	1	22.22%	6	14.81%	4	11.11%	3	48.15%	13	27
		1999	2.13	0.78	0.00%	0	0.00%	0	14.29%	3	14.29%	3	9.52%	2	61.90%	13	21
	<u>UGS</u>	1998	2.29	0.73	0.35%	1	1.74%	5	26.13%	75	36.24%	104	9.06%	26	26.48%	76	287
		1999	2.19	0.79	1.28%	3	1.28%	3	20.00%	47	40.00%	94	12.34%	29	25.11%	59	235

Appendix A4, continued

[illegible]

Appendix A5

Yes/no questions by program.

Question	Program	year	yes		no		N/A		blank		total
xi.	<u>GRA</u>	1998	28.75%	23	41.25%	33	30.00%	24			80
		1999	42.19%	27	28.13%	18	29.69%	19			64
	<u>HS Co-op</u>	1998	0.00%	0	10.00%	1	90.00%	9			10
		1999	9.09%	1	0.00%	0	90.91%	10			11
	<u>"other," blanks</u>	1998	7.41%	2	11.11%	3	81.48%	22			27
		1999	14.29%	3	23.81%	5	61.90%	13			21
	<u>UGS</u>	1998	10.10%	29	15.33%	44	74.56%	214			287
		1999	11.49%	27	13.62%	32	74.89%	176			235
xii.	<u>GRA</u>	1998	66.25%	53	27.50%	22	6.25%	5			80
		1999	53.13%	34	35.94%	23	10.94%	7			64
	<u>HS Co-op</u>	1998	50.00%	5	0.00%	0	50.00%	5			10
		1999	36.36%	4	0.00%	0	63.64%	7			11
	<u>"other," blanks</u>	1998	51.85%	14	7.41%	2	40.74%	11			27
		1999	52.38%	11	0.00%	0	47.62%	10			21
	<u>UGS</u>	1998	82.23%	236	2.09%	6	15.68%	45			287
		1999	80.00%	188	1.70%	4	18.30%	43			235
5	<u>GRA</u>	1998	90.00%	72	10.00%	8			0.00%	0	80
		1999	89.06%	57	9.38%	6			1.56%	1	64
	<u>HS Co-op</u>	1998	90.00%	9	10.00%	1			0.00%	0	10
		1999	81.82%	9	18.18%	2			0.00%	0	11
	<u>"other," blanks</u>	1998	51.85%	14	7.41%	2			40.74%	11	27
		1999	42.86%	9	19.05%	4			38.10%	8	21
	<u>UGS</u>	1998	84.67%	243	13.94%	40			1.39%	4	287
		1999	84.68%	199	13.19%	31			2.13%	5	235
7a.	<u>GRA</u>	1998	83.75%	67	16.25%	13			0.00%	0	80
		1999	73.44%	47	23.44%	15			3.13%	2	64
	<u>HS Co-op</u>	1998	70.00%	7	20.00%	2			10.00%	1	10
		1999	45.45%	5	36.36%	4			18.18%	2	11
	<u>"other," blanks</u>	1998	55.56%	15	22.22%	6			22.22%	6	27
		1999	66.67%	14	0.00%	0			33.33%	7	21
	<u>UGS</u>	1998	70.73%	203	22.30%	64			6.97%	20	287
		1999	71.06%	167	25.96%	61			2.98%	7	235

Appendix A5, continued

Question Program		year	yes		no		N/A	blank		total
8a.	<u>GRA</u>	1998	98.75%	79	0.00%	0		1.25%	1	80
		1999	100.00%	64	0.00%	0		0.00%	0	64
	- <u>HS Co-op</u>	1998	90.00%	9	0.00%	0		10.00%	1	10
		1999	90.91%	10	0.00%	0		9.09%	1	11
	- <u>"other," blanks</u>	1998	81.48%	22	0.00%	0		18.52%	5	27
		1999	57.14%	12	4.76%	1		38.10%	8	21
	- <u>UGS</u>	1998	97.91%	281	0.70%	2		1.39%	4	287
		1999	97.02%	228	1.28%	3		1.70%	4	235
9a.	<u>GRA</u>	1998	30.00%	24	6.25%	5		63.75%	51	80
		1999	29.69%	19	10.94%	7		59.38%	38	64
	- <u>HS Co-op</u>	1998	50.00%	5	0.00%	0		50.00%	5	10
		1999	45.45%	5	9.09%	1		45.45%	5	11
	- <u>"other," blanks</u>	1998	33.33%	9	7.41%	2		59.26%	16	27
		1999	23.81%	5	9.52%	2		66.67%	14	21
	- <u>UGS</u>	1998	34.84%	100	6.27%	18		58.89%	169	287
		1999	35.32%	83	8.09%	19		56.60%	133	235
12a.	<u>GRA</u>	1998	13.75%	11				86.25%	69	80
		1999	15.63%	10				84.38%	54	64
	- <u>HS Co-op</u>	1998	10.00%	1				90.00%	9	10
		1999	0.00%	0				100.00%	11	11
	- <u>"other," blanks</u>	1998	22.22%	6				77.78%	21	27
		1999	4.76%	1				95.24%	20	21
	- <u>UGS</u>	1998	17.77%	51				82.23%	236	287
		1999	17.02%	40				82.98%	195	235
12b.	<u>GRA</u>	1998	22.50%	18				77.50%	62	80
		1999	14.06%	9				85.94%	55	64
	- <u>HS Co-op</u>	1998	20.00%	2				80.00%	8	10
		1999	0.00%	0				100.00%	11	11
	- <u>"other," blanks</u>	1998	11.11%	3				88.89%	24	27
		1999	0.00%	0				100.00%	21	21
	- <u>UGS</u>	1998	8.01%	23				91.99%	264	287
		1999	9.36%	22				90.64%	213	235

Appendix A5, continued

Question Program		year	yes		no	N/A	blank		total
12c.	<u>GRA</u>	1998	16.25%	13			83.75%	67	80
		1999	15.63%	10			84.38%	54	64
	- <u>HS Co-op</u>	1998	10.00%	1			90.00%	9	10
		1999	9.09%	1			90.91%	10	11
	- <u>"other," blanks</u>	1998	18.52%	5			81.48%	22	27
		1999	9.52%	2			90.48%	19	21
	- <u>UGS</u>	1998	18.12%	52			81.88%	235	287
		1999	16.17%	38			83.83%	197	235
12d.	<u>GRA</u>	1998	31.25%	25			68.75%	55	80
		1999	35.94%	23			64.06%	41	64
	- <u>HS Co-op</u>	1998	30.00%	3			70.00%	7	10
		1999	63.64%	7			36.36%	4	11
	- <u>"other," blanks</u>	1998	40.74%	11			59.26%	16	27
		1999	19.05%	4			80.95%	17	21
	- <u>UGS</u>	1998	38.33%	110			61.67%	177	287
		1999	35.74%	84			64.26%	151	235
13a.	<u>GRA</u>	1998	52.50%	42	46.25%	37	1.25%	1	80
		1999	48.44%	31	46.88%	30	4.69%	3	64
	- <u>HS Co-op</u>	1998	30.00%	3	70.00%	7	0.00%	0	10
		1999	18.18%	2	72.73%	8	9.09%	1	11
	- <u>"other," blanks</u>	1998	44.44%	12	40.74%	11	14.81%	4	27
		1999	28.57%	6	33.33%	7	38.10%	8	21
	- <u>UGS</u>	1998	38.33%	110	58.54%	168	3.14%	9	287
		1999	46.38%	109	48.09%	113	5.53%	13	235

Appendix A6

Categorical questions by race (1998 only).

1a.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.13	0.72	0	0.00%	1	6.67%	2	13.33%	10	66.67%	2	13.33%	0	0.89%	15
Black	1.63	0.48	0	0.00%	0	0.00%	0	0.00%	5	62.50%	3	37.50%	0	0.00%	8
Hispanic	1.89	0.77	0	0.00%	4	2.88%	22	15.83%	65	46.76%	45	32.37%	3	2.16%	139
Native A.	1.67	0.47	0	0.00%	0	0.00%	0	0.00%	4	57.14%	2	28.57%	1	14.29%	7
White	1.86	0.77	2	1.13%	2	1.13%	22	12.43%	90	50.85%	57	32.20%	4	2.26%	177
blank	1.98	0.93	1	1.72%	1	1.72%	13	22.41%	18	31.03%	19	32.76%	6	10.34%	58

1b.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.33	0.70	0	0.00%	0	0.00%	7	46.67%	6	40.00%	2	13.33%	0	0.89%	15
Black	2.14	1.25	0	0.00%	2	25.00%	0	0.00%	2	25.00%	3	37.50%	1	12.50%	8
Hispanic	2.12	0.78	0	0.00%	4	2.88%	36	25.90%	60	43.17%	29	20.86%	10	7.19%	139
Native A.	1.71	0.70	0	0.00%	0	0.00%	1	14.29%	3	42.86%	3	42.86%	0	0.00%	7
White	2.44	0.84	2	1.13%	13	7.34%	62	35.03%	71	40.11%	20	11.30%	9	5.08%	177
blank	2.61	0.87	0	0.00%	6	10.34%	22	37.93%	12	20.69%	6	10.34%	12	20.69%	58

1c.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.93	0.70	0	0.00%	3	20.00%	7	46.67%	4	26.67%	0	0.00%	1	0.00%	15
Black	3.50	1.32	2	25.00%	3	37.50%	1	12.50%	1	12.50%	1	12.50%	0	0.00%	8
Hispanic	2.49	0.79	0	0.00%	6	4.32%	48	34.53%	31	22.30%	12	8.63%	42	30.22%	139
Native A.	2.33	0.47	0	0.00%	0	0.00%	2	28.57%	4	57.14%	0	0.00%	1	14.29%	7
White	2.51	1.00	4	2.26%	15	8.47%	46	25.99%	43	24.29%	22	12.43%	47	26.55%	177
blank	2.54	0.90	1	1.72%	3	5.17%	17	29.31%	13	22.41%	5	8.62%	19	32.76%	58

Appendix A6, continued

2	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.40	1.02	1	6.67%	0	0.00%	6	40.00%	5	33.33%	3	20.00%	0	1.33%	15
Black	1.88	1.05	0	0.00%	1	12.50%	1	12.50%	2	25.00%	4	50.00%	0	0.00%	8
Hispanic	2.30	1.13	5	3.60%	10	7.19%	16	11.51%	36	25.90%	24	17.27%	48	34.53%	139
Native A.	1.67	0.47	0	0.00%	0	0.00%	0	0.00%	4	57.14%	2	28.57%	1	14.29%	7
White	2.01	1.07	5	2.82%	9	5.08%	28	15.82%	46	25.99%	59	33.33%	30	16.95%	177
blank	2.00	0.95	1	1.72%	2	3.45%	8	13.79%	18	31.03%	15	25.86%	14	24.14%	58

3	mean	s.d.	5		4		3		2		1		N/A		n
Asian	1.43	0.49	0	0.00%	0	0.00%	0	0.00%	6	40.00%	8	53.33%	1	3.56%	15
Black	1.13	0.33	0	0.00%	0	0.00%	0	0.00%	1	12.50%	7	87.50%	0	0.00%	8
Hispanic	1.49	0.79	0	0.00%	3	2.16%	15	10.79%	23	16.55%	85	61.15%	13	9.35%	139
Native A.	1.86	0.83	0	0.00%	0	0.00%	2	28.57%	2	28.57%	3	42.86%	0	0.00%	7
White	1.66	0.97	5	2.82%	5	2.82%	16	9.04%	44	24.86%	99	55.93%	8	4.52%	177
blank	1.73	1.09	2	3.45%	3	5.17%	3	5.17%	12	20.69%	28	48.28%	10	17.24%	58

4	mean	s.d.	5		4		3		2		1		N/A		n
Asian	1.86	0.83	0	0.00%	1	6.67%	1	6.67%	7	46.67%	5	33.33%	1	2.22%	15
Black	1.43	0.73	0	0.00%	0	0.00%	1	12.50%	1	12.50%	5	62.50%	1	12.50%	8
Hispanic	1.60	0.85	0	0.00%	4	2.88%	15	10.79%	24	17.27%	67	48.20%	29	20.86%	139
Native A.	2.00	0.93	0	0.00%	1	14.29%	0	0.00%	4	57.14%	2	28.57%	0	0.00%	7
White	1.90	1.06	6	3.39%	8	4.52%	23	12.99%	51	28.81%	73	41.24%	16	9.04%	177
blank	1.72	1.00	2	3.45%	1	1.72%	4	6.90%	15	25.86%	25	43.10%	11	18.97%	58

6a.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.23	0.80	0	0.00%	1	6.67%	3	20.00%	7	46.67%	2	13.33%	2	0.89%	15
Black	1.75	0.66	0	0.00%	0	0.00%	1	12.50%	4	50.00%	3	37.50%	0	0.00%	8
Hispanic	1.88	0.84	0	0.00%	6	4.32%	21	15.11%	55	39.57%	48	34.53%	9	6.47%	139
Native A.	2.00	0.58	0	0.00%	0	0.00%	1	14.29%	4	57.14%	1	14.29%	1	14.29%	7
White	1.99	0.92	4	2.26%	7	3.95%	23	12.99%	78	44.07%	50	28.25%	15	8.47%	177
blank	2.00	1.14	2	3.45%	3	5.17%	7	12.07%	12	20.69%	19	32.76%	15	25.86%	58

Appendix A6, continued

10a.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.86	0.52	0	0.00%	1	6.67%	10	66.67%	3	20.00%	0	0.00%	1	0.00%	15
Black	2.33	0.75	0	0.00%	0	0.00%	3	37.50%	2	25.00%	1	12.50%	2	25.00%	8
Hispanic	2.29	0.72	0	0.00%	4	2.88%	39	28.06%	56	40.29%	14	10.07%	26	18.71%	139
Native A.	2.00	0.58	0	0.00%	0	0.00%	1	14.29%	4	57.14%	1	14.29%	1	14.29%	7
White	2.28	0.70	1	0.56%	2	1.13%	44	24.86%	69	38.98%	14	7.91%	47	26.55%	177
blank	2.26	0.74	0	0.00%	1	1.72%	12	20.69%	16	27.59%	5	8.62%	24	41.38%	58

11a.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.08	0.64	0	0.00%	0	0.00%	3	20.00%	7	46.67%	2	13.33%	3	0.89%	15
Black	1.33	0.75	0	0.00%	0	0.00%	1	12.50%	0	0.00%	5	62.50%	2	25.00%	8
Hispanic	1.84	0.93	2	1.44%	4	2.88%	21	15.11%	41	29.50%	55	39.57%	16	11.51%	139
Native A.	1.57	0.73	0	0.00%	0	0.00%	1	14.29%	2	28.57%	4	57.14%	0	0.00%	7
White	2.05	1.06	6	3.39%	8	4.52%	29	16.38%	53	29.94%	55	31.07%	26	14.69%	177
blank	2.24	1.09	2	3.45%	2	3.45%	13	22.41%	12	20.69%	13	22.41%	16	27.59%	58

13b.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.25	0.83	0	0.00%	1	6.67%	1	6.67%	5	33.33%	1	6.67%	7	0.44%	15
Black	2.33	0.94	0	0.00%	1	12.50%	1	12.50%	3	37.50%	1	12.50%	2	25.00%	8
Hispanic	2.32	0.67	0	0.00%	1	0.72%	12	8.63%	18	12.95%	3	2.16%	105	75.54%	139
Native A.	2.67	0.94	0	0.00%	1	14.29%	0	0.00%	2	28.57%	0	0.00%	4	57.14%	7
White	2.26	0.95	1	0.56%	7	3.95%	23	12.99%	32	18.08%	19	10.73%	95	53.67%	177
blank	2.67	1.19	3	5.17%	4	6.90%	8	13.79%	10	17.24%	5	8.62%	28	48.28%	58

14a.	mean	s.d.	5		4		3		2		1		N/A		n
Asian	2.71	0.70	0	0.00%	1	6.67%	3	20.00%	3	20.00%	0	0.00%	8	0.00%	15
Black	3.00	1.63	2	25.00%	0	0.00%	2	25.00%	0	0.00%	2	25.00%	2	25.00%	8
Hispanic	2.34	1.17	6	4.32%	9	6.47%	23	16.55%	30	21.58%	27	19.42%	44	31.65%	139
Native A.	2.00	1.00	0	0.00%	1	14.29%	0	0.00%	3	42.86%	2	28.57%	1	14.29%	7
White	2.66	1.25	11	6.21%	10	5.65%	25	14.12%	27	15.25%	18	10.17%	86	48.59%	177
blank	2.58	1.18	2	3.45%	3	5.17%	9	15.52%	6	10.34%	6	10.34%	32	55.17%	58

Appendix A7

Yes/no questions by race (1998 only).

<i>xi.</i>	yes	no	N/A	n
Asian	1 6.67%	6 40.00%	8 53.33%	15
Black	2 25.00%	1 12.50%	5 62.50%	8
Hispanic	19 13.67%	15 10.79%	105 75.54%	139
Native American	2 28.57%	0 0.00%	5 71.43%	7
White	22 12.43%	49 27.68%	106 59.89%	177
no race given	8 13.79%	10 17.24%	40 68.97%	58

<i>xii.</i>	yes	no	N/A	n
Asian	11 73.33%	2 13.33%	2 13.33%	15
Black	8 100.00%	0 0.00%	0 0.00%	8
Hispanic	101 72.66%	7 5.04%	31 22.30%	139
Native American	7 100.00%	0 0.00%	0 0.00%	7
White	144 81.36%	16 9.04%	17 9.60%	177
no race given	37 63.79%	5 8.62%	16 27.59%	58

5	yes	no	blank	n
Asian	11 73.33%	4 26.67%	0 0.00%	15
Black	8 100.00%	0 0.00%	0 0.00%	8
Hispanic	125 89.93%	13 9.35%	1 0.72%	139
Native American	6 85.71%	1 14.29%	0 0.00%	7
White	149 84.18%	25 14.12%	3 1.69%	177
no race given	42 72.41%	11 18.97%	5 8.62%	58

Appendix A7, continued

7a.	yes	no	blank	n
Asian	11 73.33%	4 26.67%	0 0.00%	15
Black	7 87.50%	0 0.00%	1 12.50%	8
Hispanic	94 67.63%	38 27.34%	7 5.04%	139
Native American	6 85.71%	0 0.00%	1 14.29%	7
White	135 76.27%	33 18.64%	9 5.08%	177
no race given	39 67.24%	10 17.24%	9 15.52%	58

8a.	yes	no	blank	n
Asian	15 100.00%	0 0.00%	0 0.00%	15
Black	8 100.00%	0 0.00%	0 0.00%	8
Hispanic	138 99.28%	0 0.00%	1 0.72%	139
Native American	7 100.00%	0 0.00%	0 0.00%	7
White	172 97.18%	2 1.13%	3 1.69%	177
no race given	51 87.93%	0 0.00%	7 12.07%	58

9a.	yes	no	blank	n
Asian	8 53.33%	4 26.67%	3 20.00%	15
Black	3 37.50%	0 0.00%	5 62.50%	8
Hispanic	42 30.22%	4 2.88%	93 66.91%	139
Native American	5 71.43%	0 0.00%	2 28.57%	7
White	66 37.29%	13 7.34%	98 55.37%	177
no race given	14 24.14%	4 6.90%	40 68.97%	58

Appendix A7, continued

12a.	yes	blank	n
Asian	4 26.67%	11 73.33%	15
Black	3 37.50%	5 62.50%	8
Hispanic	25 17.99%	114 82.01%	139
Native American	0 0.00%	7 100.00%	7
White	31 17.51%	146 82.49%	177
no race given	6 10.34%	52 89.66%	58

12b.	yes	blank	n
Asian	4 26.67%	11 73.33%	15
Black	1 12.50%	7 87.50%	8
Hispanic	19 13.67%	120 86.33%	139
Native American	0 0.00%	7 100.00%	7
White	14 7.91%	163 92.09%	177
no race given	8 13.79%	50 86.21%	58

12c.	yes	blank	n
Asian	5 33.33%	10 66.67%	15
Black	3 37.50%	5 62.50%	8
Hispanic	25 17.99%	114 82.01%	139
Native American	0 0.00%	7 100.00%	7
White	30 16.95%	147 83.05%	177
no race given	8 13.79%	50 86.21%	58

Appendix A7, continued

12d.	yes	blank	n
Asian	4 26.67%	11 73.33%	15
Black	4 50.00%	4 50.00%	8
Hispanic	50 35.97%	89 64.03%	139
Native American	5 71.43%	2 28.57%	7
White	69 38.98%	108 61.02%	177
no race given	17 29.31%	41 70.69%	58

13a.	yes	no	blank	n
Asian	8 53.33%	7 46.67%	0 0.00%	15
Black	6 75.00%	2 25.00%	0 0.00%	8
Hispanic	36 25.90%	98 70.50%	5 3.60%	139
Native American	2 28.57%	5 71.43%	0 0.00%	7
White	84 47.46%	88 49.72%	5 2.82%	177
no race given	31 53.45%	23 39.66%	4 6.90%	58

Appendix A8

Ordinal questions by gender (1998 only).

question	mean for women		mean for men		difference means women-men	women % N/As	men % N/As	difference N/As women-men
	s.d.		s.d.					
1a.	2.06	0.75	1.74	0.79	0.32	2.72%	1.49%	1.22%
1b.	2.23	0.78	2.40	0.91	-0.17	7.07%	5.47%	1.59%
1c.	2.47	0.88	2.63	0.96	-0.16	29.89%	22.89%	7.01%
2	2.19	1.14	2.04	1.03	0.15	32.61%	13.93%	18.68%
3	1.75	1.02	1.44	0.77	0.31	7.61%	5.97%	1.64%
4	1.89	1.03	1.67	0.94	0.22	15.76%	11.44%	4.32%
6a.	1.99	0.91	1.95	0.91	0.04	8.70%	8.46%	0.24%
10a.	2.19	0.66	2.40	0.76	-0.21	24.46%	21.89%	2.57%
11a.	1.81	0.90	2.11	1.07	-0.30	12.50%	16.42%	-3.92%
13b.	2.10	0.77	2.44	0.98	-0.33	67.93%	53.23%	14.70%
14a.	2.66	1.19	2.36	1.23	0.29	36.96%	44.78%	-7.82%

Appendix A9

Yes/no questions by gender (1998 only).

question	women % yes	men % yes	difference, women-men	women % no	men % no	difference, women-men	women % N/A	men % N/A	women % blank	men % blank
<i>xi</i>	12.50%	13.93%	-1.43%	15.76%	24.38%	-8.62%	71.74%	61.69%		
<i>xii</i>	78.26%	77.61%	0.65%	4.89%	9.95%	-5.06%	16.85%	12.44%		
5	83.15%	88.06%	-4.91%	15.76%	10.95%	4.82%			1.09%	1.00%
7a.	70.11%	76.62%	-6.51%	24.46%	18.41%	6.05%			5.43%	4.98%
8a.	98.91%	97.51%	1.40%	0.00%	1.00%	-1.00%			1.09%	1.49%
9a.	36.96%	33.83%	3.13%	2.72%	9.95%	-7.23%			60.33%	56.22%
12a.	15.22%	18.91%	-3.69%						84.78%	81.09%
12b.	10.87%	11.44%	-0.57%						89.13%	88.56%
12c.	16.30%	18.91%	-2.60%						83.70%	81.09%
12d.	36.41%	39.30%	-2.89%						63.59%	60.70%
13a.	33.15%	47.76%	-14.61%	63.59%	50.75%	12.84%			3.26%	1.49%

Appendix A10
LANL Student Distribution by Sex as of 6/29/00.

		GRAD RA	UGS	HS-COOP	Total	gender as a % in job category	gender as a % of all students
TSM	DNS	1	0	0	1	0.29%	0.73%
	F	115	0	0	115	33.33%	43.19%
	M	229	0	0	229	66.38%	56.08%
	Total	345	0	0	345	100.00%	100.00%
TEC	DNS	0	4	1	5	0.77%	0.73%
	F	0	227	1	228	34.92%	43.19%
	M	0	401	19	420	64.32%	56.08%
	Total	0	632	21	653	100.00%	100.00%
OS/GS	DNS	0	3	0	3	1.27%	0.73%
	F	7	173	10	190	80.51%	43.19%
	M	3	35	5	43	18.22%	56.08%
	Total	10	211	15	236	100.00%	100.00%
Total		355	843	36	1,234		

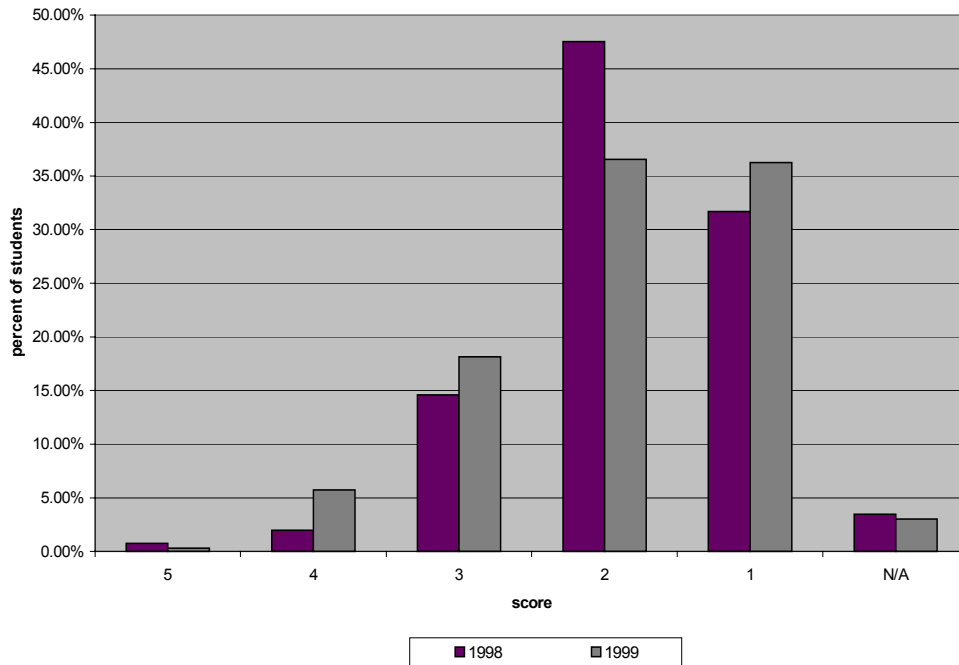
Appendix A11
LANL Student Distribution by Race/Ethnicity as of 6/29/00.

		GRAD RA	UGS	HS-COOP	Total	race as a % in job category	race as a % of all students
TSM	DNS	39	0	0	39	11.30%	7.62%
	WHITE	230	0	0	230	66.67%	50.73%
	HISPANIC	31	0	0	31	8.99%	32.66%
	NATIVE AM	5	0	0	5	1.45%	2.43%
	ASIAN	31	0	0	31	8.99%	5.27%
	BLACK	9	0	0	9	2.61%	1.30%
	Total	345	0	0	345	100.00%	100.00%
TEC	DNS	0	42	4	46	7.04%	7.62%
	WHITE	0	329	9	338	51.76%	50.73%
	HISPANIC	0	206	5	211	32.31%	32.66%
	NATIVE AM	0	20	1	21	3.22%	2.43%
	ASIAN	0	30	2	32	4.90%	5.27%
	BLACK	0	5	0	5	0.77%	1.30%
	Total	0	632	21	653	100.00%	100.00%
OS/GS	DNS	0	9	0	9	3.81%	7.62%
	WHITE	4	51	3	58	24.58%	50.73%
	HISPANIC	6	144	11	161	68.22%	32.66%
	NATIVE AM	0	3	1	4	1.69%	2.43%
	ASIAN	0	2	0	2	0.85%	5.27%
	BLACK	0	2	0	2	0.85%	1.30%
	Total	10	211	15	236	100.00%	100.00%
Total		355	843	36	1,234		

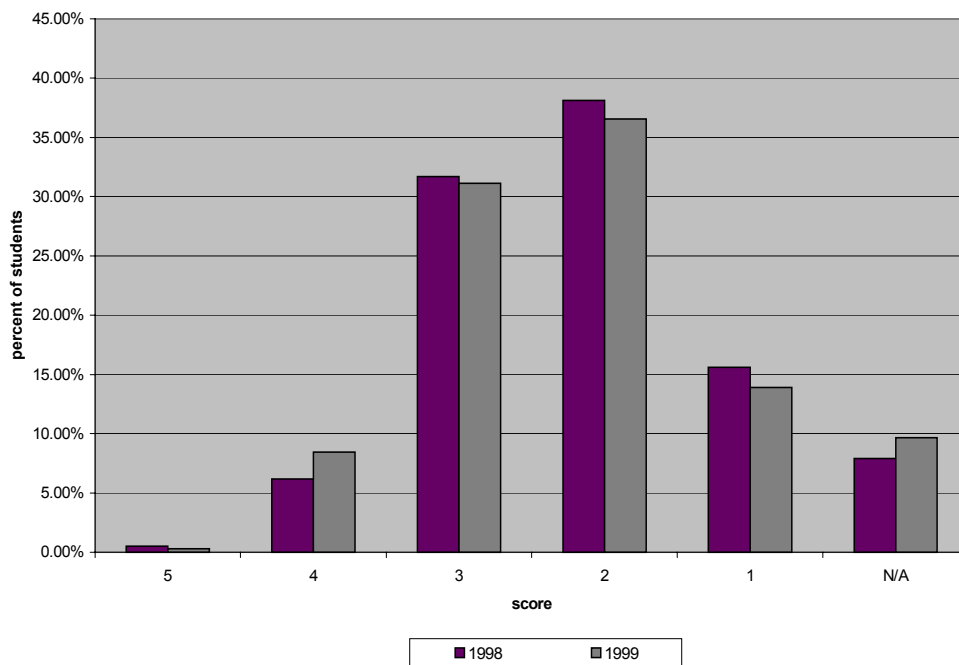
Appendix B

Histograms for answers to categorical questions.

Question 1a.

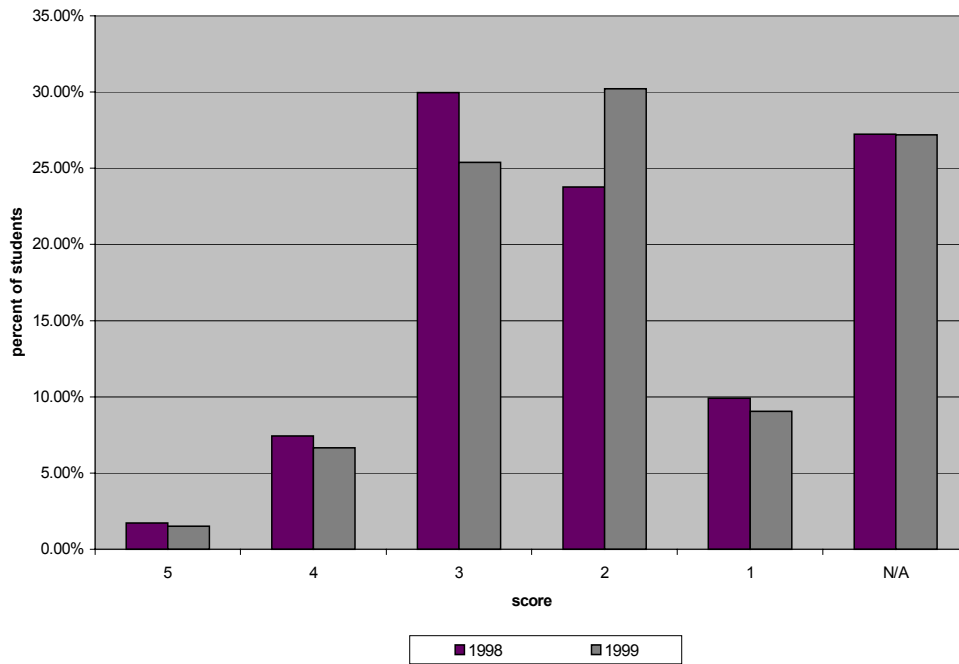


Question 1b.

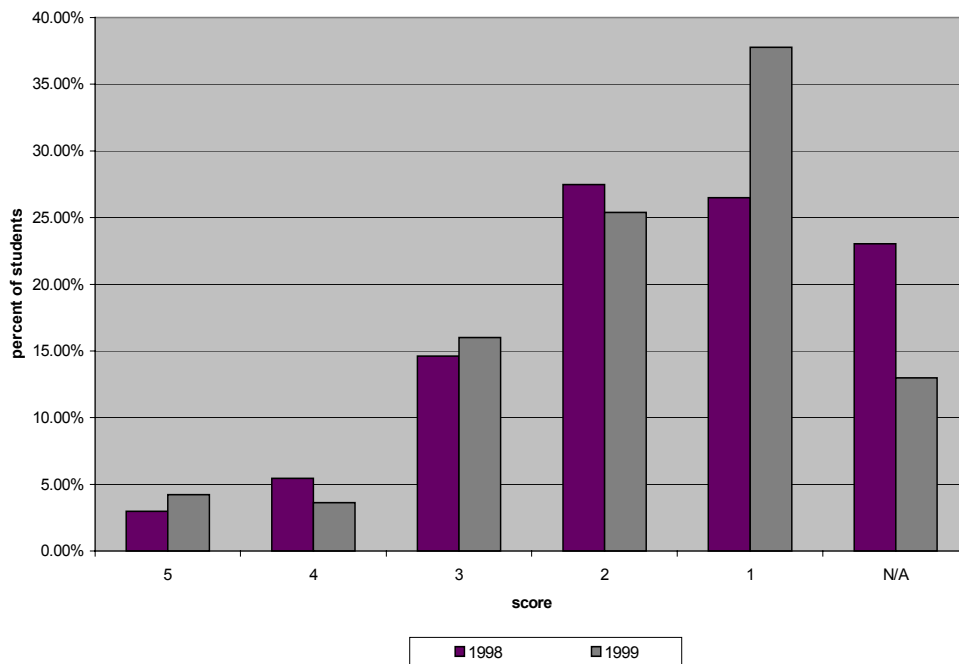


Appendix B, *continued*

Question 1c.

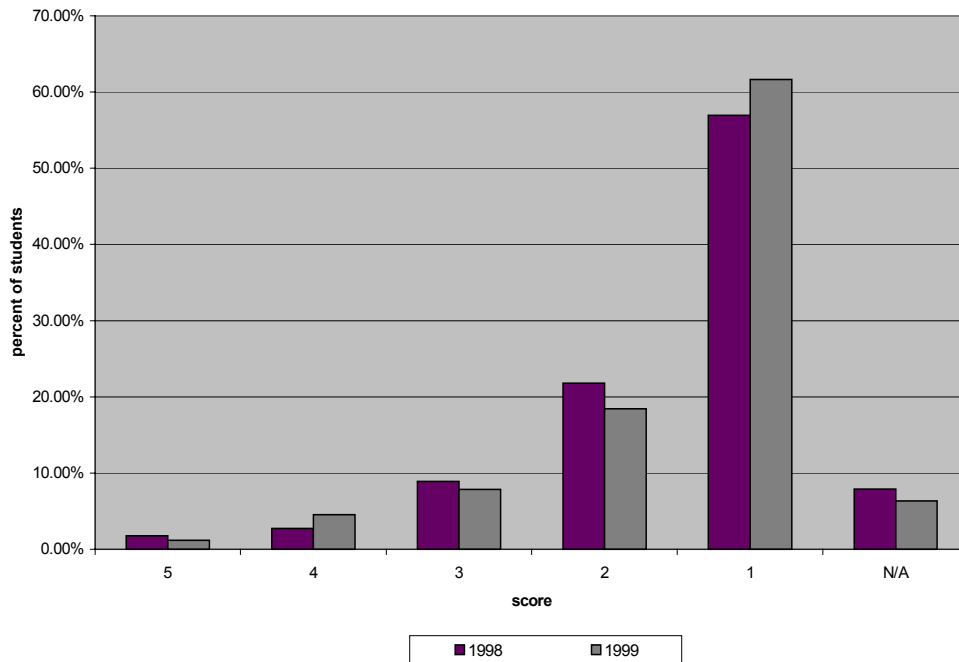


Question 2.

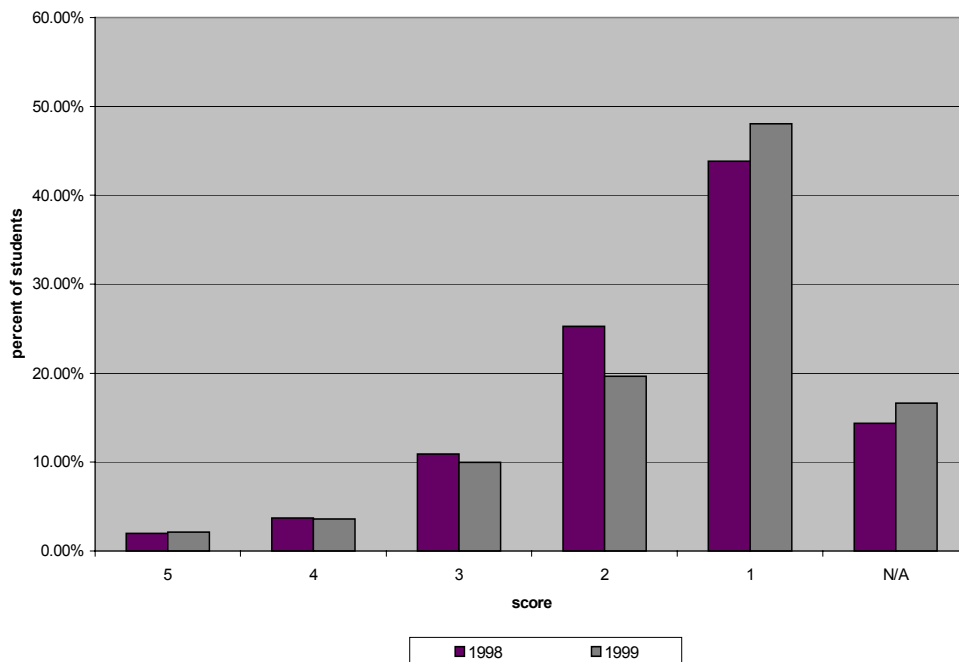


Appendix B, *continued*

Question 3.

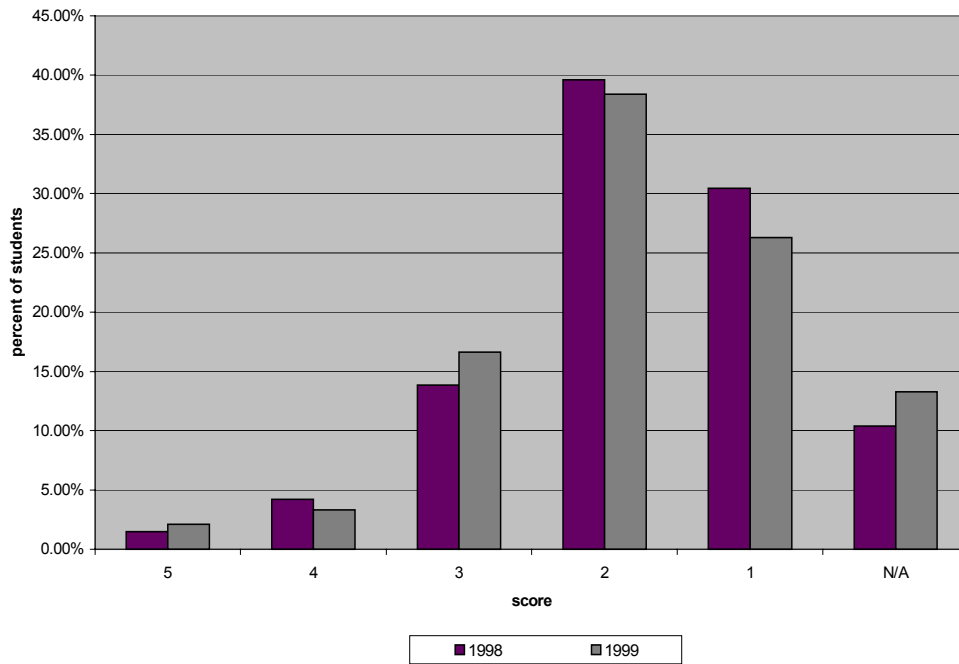


Question 4a.

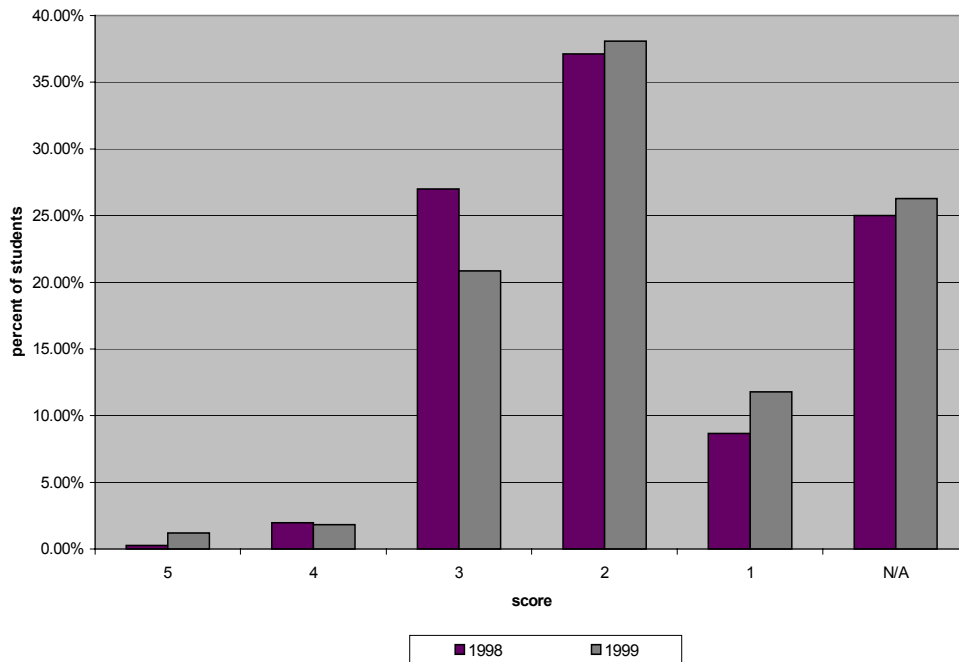


Appendix B, *continued*

Question 6a.

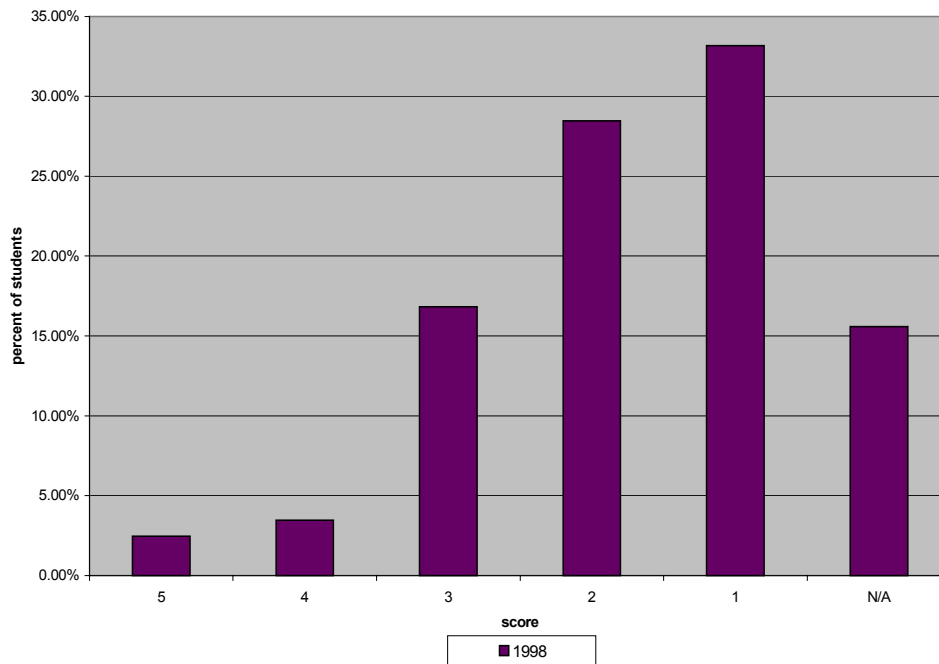


Question 10a.

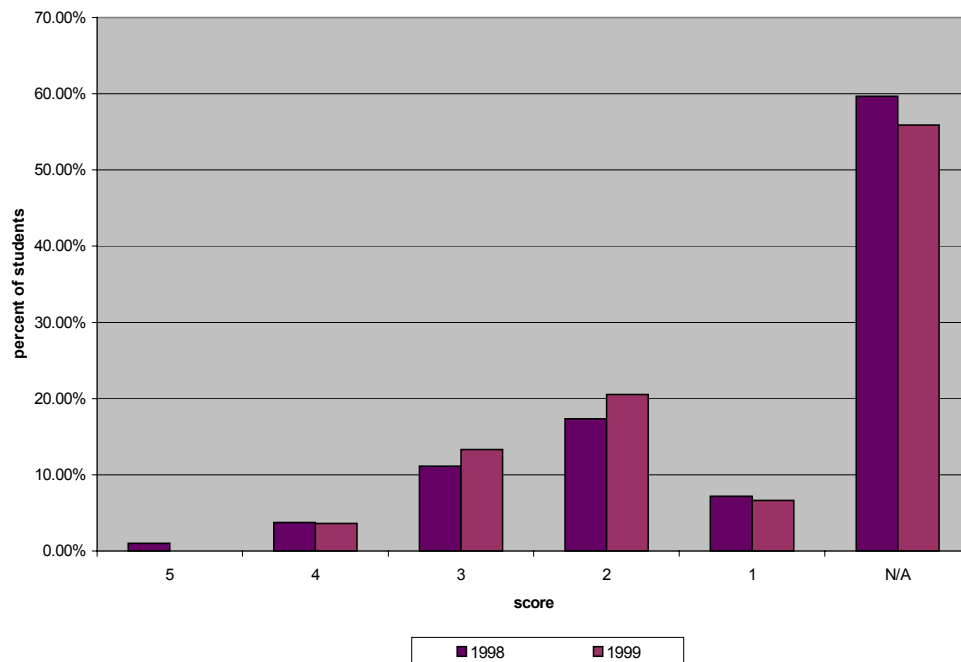


Appendix B, *continued*

Question 11a.

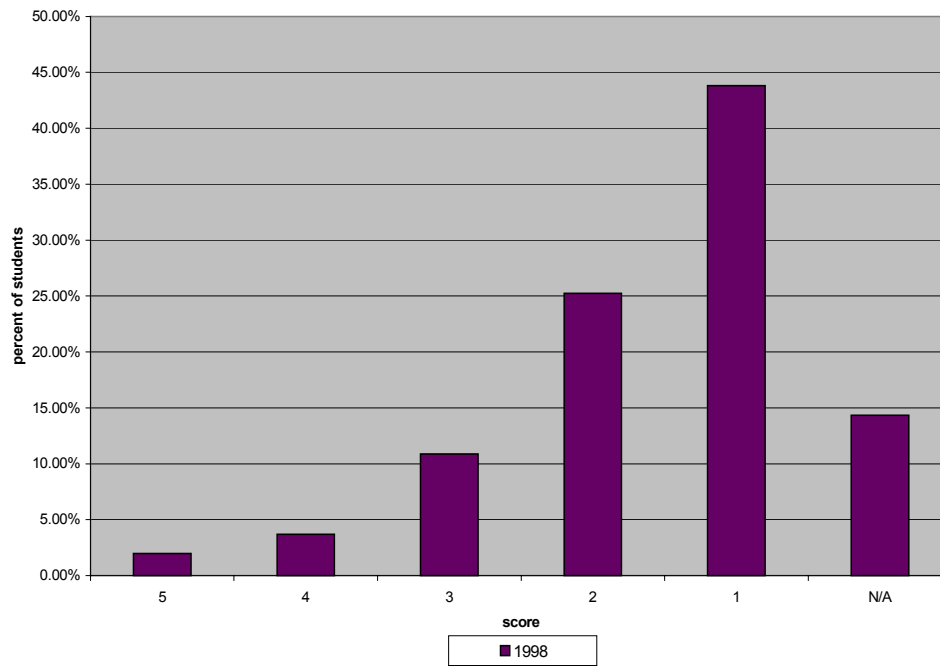


Question 13b.



Appendix B, *continued*

Question 14a.



Appendix C

Figure 2: The Number of Interview Participants According to Sex, Race/Ethnicity, and Type of Position, and Whether They Are New or Returning Interns.

Intern Interview Participants	Undergraduate Interns	Graduate Interns	Total Interns Per Category
Males	22	17	39
Females	26	19	45
<i>Total</i>	<i>48</i>	<i>36</i>	<i>84</i>
Whites	14	11	25
Hispanics	16	13	29
Asians	7	9	16
African-Americans	4	3	7
Native Americans	7	-	7
<i>Total</i>	<i>48</i>	<i>36</i>	<i>84</i>
TEC/TEC/TSM Interns	33	29	62
OS/GS Interns	15	7	22
<i>Total</i>	<i>48</i>	<i>36</i>	<i>84</i>
Newcomers	26	15	41
Returning Interns	22	21	43
<i>Total</i>	<i>48</i>	<i>36</i>	<i>84</i>

Appendix C

Figure 3: The Number of Male Interview Participants According to Position, Status in School, Race/Ethnicity, and Whether They Are New or Returning Interns.

TEC/TSM		OS/GS		Totals
Number of Undergraduates	Number of Graduates	Number of Undergraduates	Number of Graduates	
White Male Interns				
Newcomer 2	Newcomer 1	Newcomer 1	Newcomer 2	6
Returning 1	Returning 2	Returning 0	Returning 0	3
Hispanic Male Interns				
Newcomer 2	Newcomer 2	Newcomer 3	Newcomer 0	7
Returning 2	Returning 2	Returning 2	Returning 1	7
Asian Male Interns				
Newcomer 2	Newcomer 4	Newcomer 0	Newcomer 0	6
Returning 1	Returning 2	Returning 0	Returning 0	3
African American Male Interns				
Newcomer 0	Newcomer 1	Newcomer 0	Newcomer 0	1
Returning 2	Returning 0	Returning 1	Returning 0	3
Native American Male Interns				
Newcomer 2	Newcomer 0	Newcomer 0	Newcomer 0	2
Returning 1	Returning 0	Returning 0	Returning 0	1
TOTALS 15	14	7	3	39

Interviews with male interns: 24 interviews with 39 interns (22 undergraduate and 17 graduate).

Appendix C

Figure 4: The Number of Female Interview Participants According to Position, Status in School, Race/Ethnicity, and Whether They Are New or Returning Interns.

TEC/TSM		OS/GS		Totals
Number of Undergraduates	Number of Graduates	Number of Undergraduates	Number of Graduates	
White Female Interns				
Newcomer 3	Newcomer 2	Newcomer 2	Newcomer 0	7
Returning 2	Returning 3	Returning 3	Returning 1	9
Hispanic Female Interns				
Newcomer 3	Newcomer 2	Newcomer 1	Newcomer 0	6
Returning 1	Returning 3	Returning 2	Returning 3	9
Asian Female Interns				
Newcomer 2	Newcomer 0	Newcomer 0	Newcomer 0	2
Returning 2	Returning 3	Returning 0	Returning 0	5
African American Female Interns				
Newcomer 1	Newcomer 1	Newcomer 0	Newcomer 0	2
Returning 0	Returning 1	Returning 0	Returning 0	1
Native American Female Interns				
Newcomer 2	Newcomer 0	Newcomer 0	Newcomer 0	2
Returning 2	Returning 0	Returning 0	Returning 0	2
TOTALS 18	15	8	4	45

Interviews with female interns: 23 interviews with 45 interns (26 undergraduate and 19 graduate).

Appendix C

**Figure 5: Number of Interns Interviewed Individually,
in Groups of Two or Three (by Total Number of Participants)
According to Undergraduate and Graduate Status.**

Type of Interview	Undergraduate Interns	Graduate Interns	Total Interns Per Category
Interviewed Individually	8	10	18
Interviewed in Groups of Two	28	14	42
Interviewed in Groups of Three	12	12	24
Total	48	36	84

Appendix D

Protocol for Los Alamos (LANL): Undergraduates

Background

What year are you in college?

Where do you attend college?

What is your major in college?

Do you live in the area or does your internship require relocation?

How did you find out about the internship program here?

Were you recruited?

Relationship of Internship to Career Plans

*Is there a good fit between your internship here and your career goals? (Educational work plan—how well does this fit with what you did?)

Has your internship experience affected your career goals?

How?

Whose influence? (Mentor? Coworkers? Other?)

What are the other major influences in your career planning?

(Parents/Advisors/Peers, etc.)

What are your goals for your internship?

Do you feel these goals are being met?

What is expected of you in your internship (not a job description, but overall---of interns in general)?

Are these realistic/appropriate expectations?

*What are the costs/benefits of continuing internships here vs varied experiences by going elsewhere?

*Do you consider coming back next year/summer for another internship after this one, if there is funding available?

*How would you like that experience to be different from this one?

What are your hopes for that one?

Does the system of application/reassignment work well for you, or would you suggest a change?

*In light of recent developments at the lab (fire, safety issue), how do you feel about the lab? How do you see the future of the lab? Does it affect your experience/planning in any way?

Do you hope to work here after graduation?

Has anyone encouraged you to apply then?

Do you expect to get work here then?

Would you like to make a career here?

Appendix D, *continued*

Feedback re Internship Experiences

Do you work one-on-one with your mentor or are you in a work group?

Does this work well for you?

How would you describe your relationship with your mentor?

Minimal? Good? Beyond expectations?

*How attentive do you feel your mentor is to you?

*If poor experience, ask about how they think it should be handled?

Are resources to deal with this adequate? (ombudsman, student advisor, employee assistance office)?

What expectations do you have of a mentor?

What are your needs in a mentor?

Have your expectations changed over time?

If you could go back in time, knowing everything you know now, how would you approach your internship here?

Would you choose the same internship?

What would you do the same/differently?

*If you had all the resources you needed and were in a position to make the decisions, what changes would you make in the internship program at LANL? (How it's administered)

What are the best things about your experiences here?

What are the things in greatest need of attention/change here? (worst aspects of experience/weaknesses of internship program)

Do you feel that your salary is competitive?

Are you satisfied with the housing accommodations?

Do you feel a part of the community here?

Do you interact with other interns much, or are you relatively isolated?

Are these relationships helpful to you?

Do you participate in any of the LANL Student Association activities?

Are these enjoyable/beneficial to you?

Race/Gender Issues

Are there race/ethnicity issues here at the lab?

Are there gender issues here at the lab?

How do these issues affect you?

Other

Are there other things we ought to talk about that I haven't thought to ask you?

Appendix D, *continued*

Protocol for Los Alamos Interns: Graduate Students

Background

What degree are you working toward? (MS? Ph.D.?)

In what discipline?

Through which university?

Do you live in the area or does your internship require relocation?

How did you find out about the internship program here?

Were you recruited?

Relationship of Internship to Career Plans

*Is there a good fit between your internship here and your career goals? (Educational work plan—how well does this fit with what you did?)

Has your internship experience affected your career goals?

How?

Whose influence? (Mentor? Coworkers? Other?)

What are the other major influences in your career planning?
(Parents/Advisors/Peers, etc.)

What are your goals for your internship?

Do you feel these goals are being met?

What is expected of you in your internship (not a job description, but overall---of interns in general)?

Are these realistic/appropriate expectations?

*What are the costs/benefits of continuing internships here vs varied experiences by going elsewhere?

*Do you consider coming back next year/summer for another internship after this one, if there is funding available?

*How would you like that experience to be different from this one?

What are your hopes for that one?

Does the system of application/reassignment work well for you, or would you suggest a change?

Do you plan to apply for another internship after this one (i.e. Postdoc Program)?

What are your hopes for that one?

*In light of recent developments at the lab (fire, safety issue), how do you feel about the lab? How do you see the future of the lab? Does it affect your experience/planning in any way?

Appendix D, *continued*

Do you hope to work here after graduation?
Has anyone encouraged you to apply then?
Do you expect to get work here then?

Feedback re Internship Experiences

Do you work one-on-one with your mentor or are you in a work group?
Does this work well for you?
How would you describe your relationship with your mentor?
Minimal? Good? Beyond expectations?
*How attentive do you feel your mentor is to you?
*If poor experience, ask about how they think it should be handled?
Are resources to deal with this adequate? (ombudsman, student advisor, employee assistance office)?

What expectations do you have of a mentor?
What are your needs in a mentor?
Have your expectations changed over time?

If you could go back in time, knowing everything you know now, how would you approach your internship here?
Would you choose the same internship?
What would you do the same/differently?

*If you had all the resources you needed and were in a position to make the decisions, what changes would you make in the internship program at LANL? (How it's administered)
What are the best things about your experiences here?
What are the things in greatest need of attention/change here? (worst aspects of experience/weaknesses of internship program)

Do you feel that your salary is competitive?
Are you satisfied with the housing accommodations?

Do you have any concerns about funding?
Have you experienced any problems with discontinued funding?
How has this affected your graduate program?
Is funding a concern to you?

Is your current work related to your dissertation or thesis topic?
If not, what barriers are you experiencing to be able to work on a topic that is mutually agreeable to LANL and the student (the student's university and advisor)?

Appendix D, *continued*

Do you feel a part of the community here?

Do you interact with other interns much, or are you relatively isolated?

Are these relationships helpful to you?

What are the best things about your experiences here?

What are the things in greatest need of attention/change here? (worst aspects of experience/weaknesses of internship program)

Do you participate in any of the LANL Student Association Activities?

Race/Gender Issues

Are there race/ethnicity issues here at the lab?

Are there gender issues here at the lab?

How do these affect you/others?

Other

Are there other things we ought to talk about that I haven't thought to ask you?

Appendix E

Consent Form for Los Alamos (LANL) Internship Evaluation

We would like you to take part in a study that will be conducted at the Los Alamos National Laboratory (LANL). Our main aim is to discover how well the internship program meets the needs of student interns. Because we are unable to interview every intern at this time, we are asking a stratified sample of interns to talk with us about their experiences as interns.

The interviews will take about one hour, and will be tape-recorded. It is important that you know that all data will be treated with anonymity. Your mentor, school, and other personnel at the lab will not know which students are interviewed, and no one except the researchers will have access to the identities of participants or the tape recordings. The tapes and all other interview materials will be kept in a locked office and destroyed at the conclusion of the study. Staff at the lab who are helping by arranging the interviews know who is scheduled to be interviewed, but will not know who actually participates. Information from the interviews will be released in aggregate form and any quotations taken from interviews will remain anonymous. Although we would very much like your views, participation is entirely voluntary, and a decision not to participate or to discontinue participation at any time will in no way affect you adversely. The research personnel will be happy to answer any questions you may have about this study.

The benefits to you are indirect and uncertain, as information from this research and evaluation will contribute to internship programs in the future. The only risk to you we have identified is that you may feel uncomfortable talking about your experiences. If you have any questions regarding your rights as a research subject, any concerns regarding this project, or any dissatisfaction with any aspects of this study you may report them, confidentially if you wish, to the Executive Secretary, Human Research Committee, University of Colorado, Graduate School, Campus 26, Regent 308, Boulder, Colorado 80309-0026 or by telephone to (303) 492-7401. Copies of the University of Colorado Assurance of Compliance to the federal government regarding human subject research are available upon request from the graduate school address listed above. We hope that you will find it worthwhile to help us gain a better understanding of the best ways in which to design the LANL internship programs.

If you agree to participate, please sign (and date) below.

Yours sincerely,

Dr. Liane Pedersen-Gallegos
University of Colorado
Campus Box 580
Boulder, Colorado 80309-0580
Phone 303 492-1104
Fax 303 492-2154
E-mail pedersel@stripe.colorado.edu

NAME (print): _____ SIGNATURE: _____

DATE: _____ MAJOR/DISCIPLINE OF STUDY: _____

Appendix F

Summary of Findings of the 1998 and 1999 Survey Comment Text Data

Q 4B: COMMENTS ON MENTORING

1999: 77 codes assigned 390 times to 162 comments

37 positive codes assigned 290 times
19 negative codes assigned 64 times
13 neutral codes assigned 25 times
8 advice/unmet needs/improve codes assigned 11 times

Q 6B: COMMENTS ON WORK PLAN

1998: 78 codes assigned 230 times to 122 comments

NB: 41 codes assigned only once: 19 positive codes, 11 negative codes, 10 neutral codes.

37 positive codes assigned 140 times
24 negative codes assigned 56 times
15 neutral codes assigned 27 times
1 advice code assigned 1 time
1 “no comment” code assigned 6 times

1999: 64 codes assigned 223 times to 121 comments

NB: 30 codes assigned only once: 12 positive codes, 11 negative codes, 5 neutral codes

27 positive codes assigned 129 times
24 negative codes assigned 60 times
9 neutral codes assigned 27 times
1 “mixed review” code assigned 1 time
1 advice code assigned 1 time
1 “no comment” code assigned 4 times
1 “did not use” comment assigned 1 time

Q 7B: INFLUENCE ON CAREER PLANS

1998: 94 codes assigned 615 times to 273 comments

44 positive codes assigned 463 times
18 degree/career objective codes (neither positive nor negative) assigned 48 times
13 negative codes assigned 42 times
12 neutral description codes assigned 52 times
6 “mixed review” codes assigned 9 times
1 “no comment” code used 1 time

1999: 95 codes assigned 466 times to 210 comments

40 positive codes assigned 326 times
25 degree/career objective codes (neither positive nor negative) assigned 48 times
12 negative codes, assigned 35 times
11 neutral description codes, assigned 44 times
6 “mixed review” codes, assigned 12 times
1 “improve” code, used 1 time

Q 8B: COMMENTS ON SAFETY

1998: 20 codes assigned 158 times to 132 comments

NB: 7 codes assigned one time (over one quarter)

- 3 positive codes assigned 69 times
- 8 negative codes assigned 67 times
- 5 advice codes assigned 5 times
- 3 neutral codes assigned 10 times
- 1 “no comment code” assigned 7 times

1999: 17 codes assigned 124 times to 100 comments

NB: 6 codes assigned one time (one third)

- 8 positive codes assigned 92 times
- 6 negative codes assigned 26 times
- 1 advice code assigned 2 times
- 1 mixed review code assigned 1 time
- 1 “no comment” code assigned 3 times

Q9B: COMMENTS ON THE ORIENTATION PACKET

1998: 23 codes assigned 81 times to 66 comments

NB: 12 codes assigned only one time: three positive codes, five negative codes, three advice codes, one neutral code

- 8 positive codes assigned 39 times
- 6 negative codes assigned 10 times
- 5 advice codes assigned 9 times
- 3 neutral codes assigned 14 times
- 1 “no comment” code assigned 9 times

1999: 22 codes assigned 55 times to 48 comments

NB: 10 codes assigned only one time: one positive code, six negative codes, two neutral codes, one advice code.

- 5 positive codes assigned 20 times
- 10 negative codes assigned 14 times
- 3 neutral codes assigned 5 times
- 2 advice codes assigned 7 times
- 2 “no comment” codes assigned 9 times

Q 10B: COMMENTS ON WEB SITE

1998: 37 codes assigned 92 times to 72 comments

NB: 23 codes used only 1 time: 5 positive codes, 5 negative codes, 10 advice codes, 2 neutral codes, and 1 mixed review code

- 10 positive codes assigned 37 times
- 6 negative codes assigned 8 times
- 12 advice codes assigned 18 times
- 5 neutral codes assigned 20 times
- 3 mixed review codes assigned 5 times
- 1 “no comment” code assigned 4 times

1999: 25 codes assigned 65 times to 56 comments

NB: 15 codes used only 1 time: 1 positive code, 4 negative codes, 6 advice codes, 3 neutral codes, 1 mixed review code.

- 2 positive codes assigned 17 times
- 6 negative codes assigned 11 times
- 10 advice codes assigned 15 times
- 3 neutral codes assigned 7 times
- 2 mixed review codes assigned 3 times
- 2 “no comment”/“can’t think of any improvements” code assigned 12 times

Q 11B/11: COMMENTS ON ON-LINE APPLICATION

1998: 42 codes assigned 197 times to 151 comments

NB: 20 codes used only 1 time: 1 positive code, 8 negative codes, 6 advice codes, 3 neutral codes, 2 mixed review code.

- 5 positive codes assigned 94 times
- 21 negative codes assigned 79 times
- 10 advice codes assigned 14 times
- 4 neutral codes assigned 8 times
- 2 mixed review codes assigned 2 times

1999: 29 codes assigned 80 times to 73 comments

NB: 15 codes used only 1 time: 10 negative codes, 4 advice codes, 1 “can’t think of any improvements” code.

- 4 positive codes assigned 36 times
- 15 negative codes assigned 23 times
- 8 advice codes assigned 12 times
- 2 “no comment”/“can’t think of any improvements” code assigned 9 times

Q 13C: COMMENTS ON STUDENT ACTIVITIES

1998: 50 codes assigned 165 times to 95 comments

NB: 17 codes used only once: four positive codes, four negative codes, four advice codes, three neutral codes, and two mixed review codes.

- 15 positive codes assigned 79 times
- 15 negative codes assigned 42 times
- 9 advice/improve codes assigned 26 times
- 8 neutral codes assigned 14 times
- 2 mixed review codes assigned 2 times
- 1 “no comment” code assigned 2 times

1999: 50 codes assigned 165 times to 95 comments

NB: 15 codes used only once: four positive codes, three negative codes, five neutral codes, two advice codes, one “no comment” code.

- 15 positive codes assigned 66 times
- 11 negative codes assigned 37 times
- 9 neutral codes assigned 16 times
- 8 advice/improve codes assigned 19 times
- 1 “no comment” code assigned 5 times
- 1 “no comment due to conflict of interest” code assigned 1 time

Q14B: COMMENTS ON STUDENT ADVISOR(S)

1998: 34 codes assigned 135 times to 97 comments

NB: 14 codes assigned 1 time: 5 positive codes, 5 negative codes, 3 advice codes, 1 neutral code

- 12 positive codes assigned 47 times
- 12 negative codes assigned 65 times
- 5 advice codes assigned 7 times
- 4 neutral codes assigned 13 times
- 1 “no comment” code assigned 3 times

1999: 30 codes assigned 107 times to 62 comments

NB: 14 codes assigned 1 time: 5 positive codes, 5 negative codes, 2 neutral codes, 1 mixed review code, 1 advice code

- 12 positive codes assigned 44 times
- 9 negative codes assigned 36 times
- 6 neutral codes assigned 20 times
- 1 mixed review code assigned 1 time
- 1 advice code assigned 1 time
- 1 “no comment” code assigned 3 times

Q 15 (1999): COMMENTS ON HOUSING OR TRANSPORTATION

Both issues taken together:

64 codes assigned 216 times to 104 comments

NB: 32 codes assigned only one time: 29 housing codes used one time; 3 transportation codes used one time

- 9 positive codes assigned 30 times
- 23 negative codes assigned 98 times
- 14 neutral codes assigned 43 times
- 14 advice/improve codes assigned 27 times
- 3 mixed review codes assigned 4 times
- 1 “no comment” code assigned 14 times

Just Housing: 50 codes assigned 176 times

7 positive codes assigned 17 times
19 negative codes assigned 91 times
11 neutral codes assigned 35 times
10 advice/improve codes assigned 15 times
3 mixed review codes assigned 4 times

Just Transportation: 13 codes assigned 40 times

2 positive codes assigned 13 times
4 negative codes assigned 7 times
3 neutral codes assigned 8 times
4 advice/improve codes assigned 12 times

Q15A (1998) Q16 (1999): OTHER COMMENTS

1998: 87 codes assigned 146 times to 57 comments

NB: 66 codes assigned only one time: 15 positive codes, 20 negative codes, 24 advice/improve codes, 6 neutral codes, 1 mixed review code.

23 positive codes assigned 55 times
25 negative codes assigned 34 times
31 advice/improve codes assigned 47 times
6 neutral codes assigned 6 times
1 mixed review code assigned 1 time
1 “no comment” code assigned 3 times

1999: 70 codes assigned 105 times to 60 comments

NB: 51 codes assigned only one time: 10 positive codes, 17 negative codes, 17 advice/improve codes, 7 neutral codes.

13 positive codes assigned 22 times
22 negative codes assigned 30 times
26 advice/improve codes assigned 36 times
8 neutral codes assigned 9 times
1 “no comment” code assigned 8 times